Successful Methods

Construction - Road Making - Engineering - Industrial - Mining

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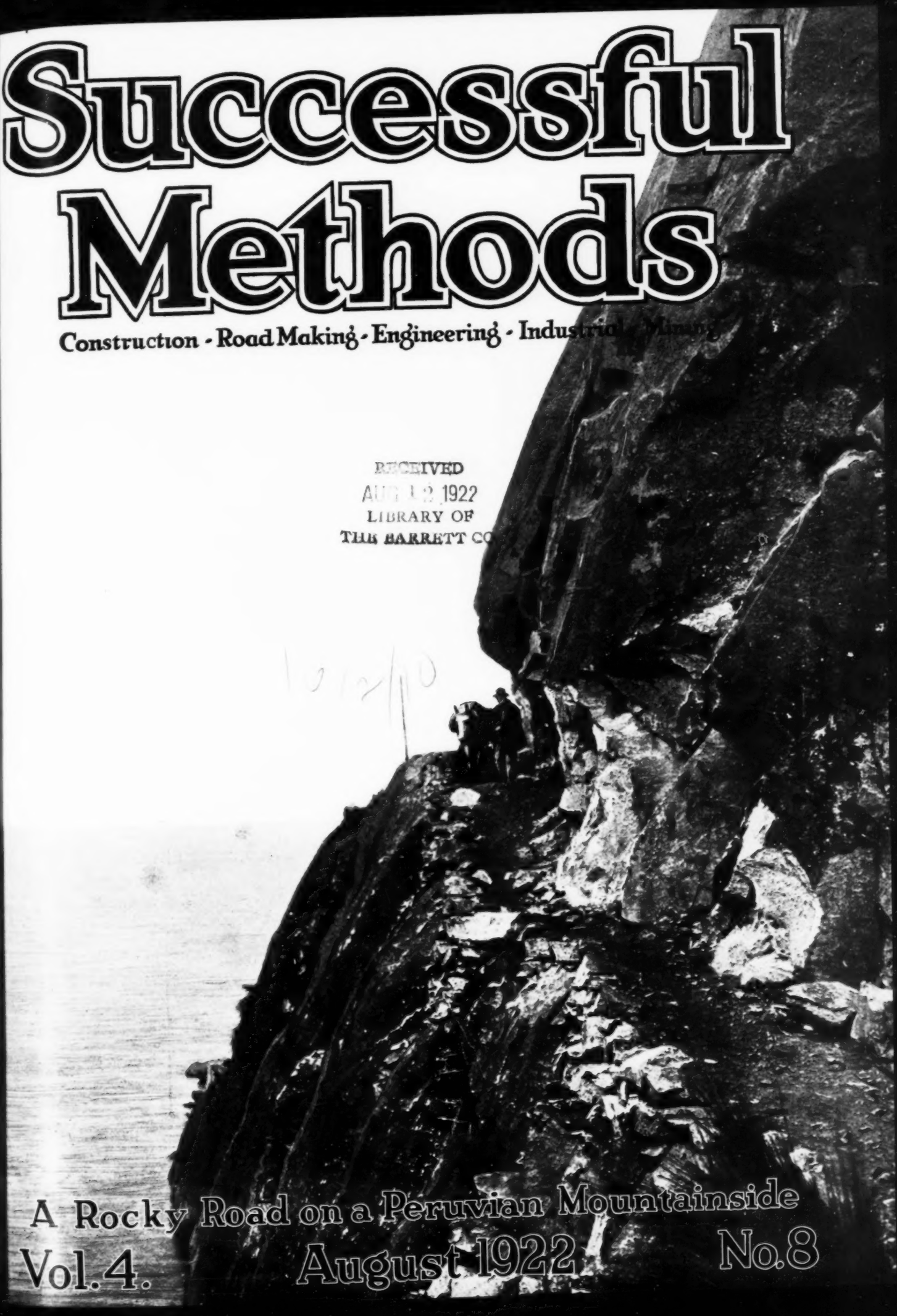
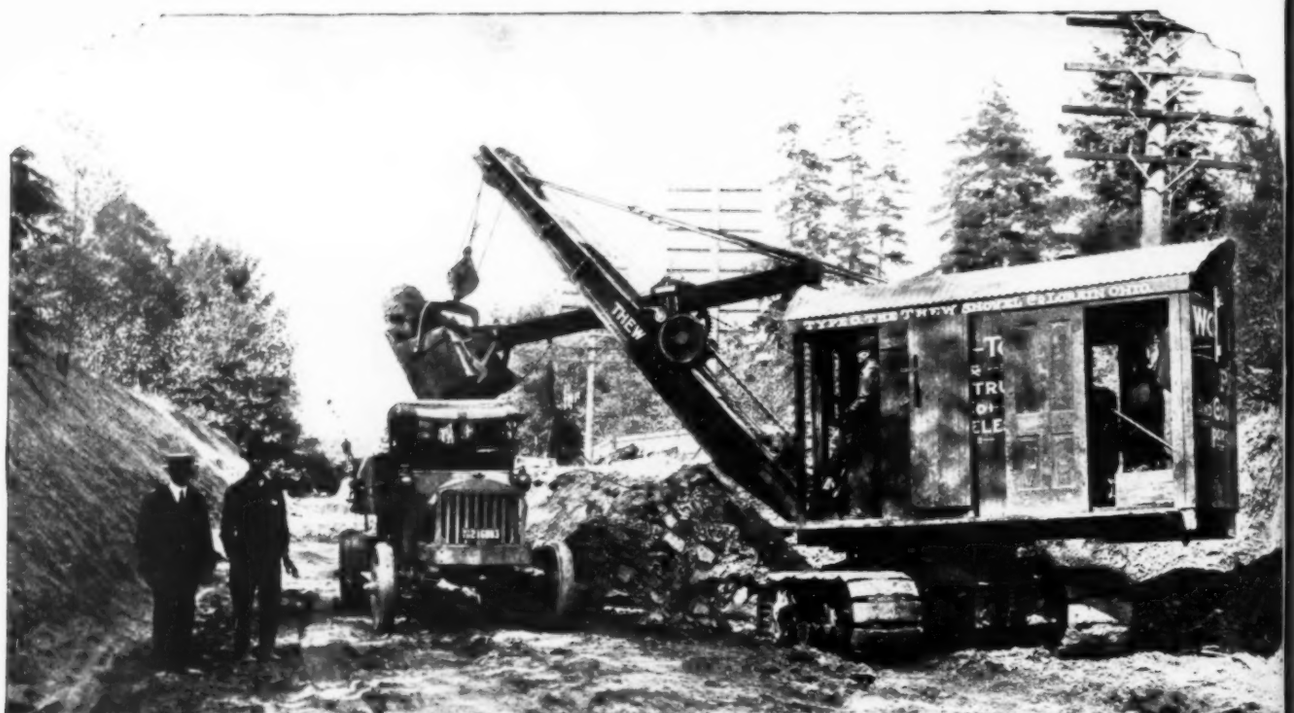


A Rocky Road on a Peruvian Mountainside

Vol. 4. August 1922 No. 8



Cut Your Costs

No wonder Tomei smiled—

When Jack Woods his partner came over to see how the job was coming along he didn't need to ask questions. The answer to low costs was in plain view.

Way up in Northwestern Washington the Thew Gasoline shovel is paying dividends for these men.

At first glance you might think from the long plate girder shipper shaft boom, the intermediate gears, the long stick and the full dipper, that this is a steam machine.

This is because the Thew Gasoline is not new. For over seven years it has been growing and developing along with its steam brother. But it has forged ahead because of its lower fuel consumption, one man operation and the fact that it is a time saver.

Like the steam it has been running on continuous tread trucks for over four years — long enough to prove correct design and construction. As shown in the picture digging over either end with proper clean up is possible.

These men didn't take any chance when they bought a Thew Gasoline Shovel. Bulletin 601 will show YOU why.

THE THEW SHOVEL COMPANY, LORAIN, O.

Thew
Power Shovels

Successful Methods

A Magazine of Construction Service

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The Construction Industry

FEW so-called men of affairs in this country appreciate the magnitude of the construction industry. Statistics on any industry of such wide ramifications may easily appear misleading. It is significant to note, however, that the 1922 road building program of the nation will probably involve the expenditure of at least seven hundred million dollars. The construction of buildings in cities and towns which issue building permits will exceed twice that figure for the first six months of 1922. Farmers are the largest consumers of cement in the country, so some idea of their construction expenditures may be had. Combining these figures with the money spent on municipal and railroad improvements, we arrived at totals that really are astonishing.

With these totals in mind, it may be surprising to find so few really large concerns directly or indirectly engaged in the construction business. The steel and cement mills are notable exceptions. There are practically no manufacturers of other raw or finished construction materials, and none of construction machinery, comparable to any one of a long list in the automotive, farm implement, railroad car and locomotive or electrical industries. Only a few really large contracting companies are in operation.

All this is due to certain limiting conditions that have existed in the industry. A change seems more than probable. We are likely to see various combinations worked out which will permit advantage to be taken of the conditions which have made for the success of large units in other industries of less magnitude. Such consolidations will offer large opportunities for improved products, lower prices and better service to the consumer.

The Car Situation

WITHOUT either a coal or rail strike there would almost certainly have been a serious car shortage this fall. These two strikes already have aggravated the situation alarmingly. At this writing it does not appear that the coal strike will be settled soon. The outlook for a settlement of the rail strike is some better. Even though both strikes should be settled immediately, the car shortage for several months to come is likely to approach the worst experiences of 1917 and 1918. We may even see the effects of these strikes well along in 1923.

Discussion of the causes of these strikes is futile to the construction industry. It would be a good deal like telling the victims of a cyclone of the theory of what causes such a storm. What the industry wants to know is how to get materials so it can keep going—not only now but for months to come.

There is no one solution. In many cases there is no solution at all except to wait until cars can be had. For some jobs it is practical to use motor trucks in place of rail delivery. Opening up of local sand, gravel and stone deposits will be resorted to in many cases. This move seems the most logical over large areas where such materials may be had. Moving raw materials by water also offers a means of relief to which more attention should be given. Manufacturers of machinery and finished materials will likely work out their end of the problem.

The main point is not to underestimate the probable severity and duration of the car shortage that is upon us. It would be foolish to think that the settlement of the strikes will very soon make cars available. The side tracks of the country are filled with bad order cars. Railroad motive power is in bad shape. The coal bins of the nation are empty. These conditions cannot quickly be remedied. Meanwhile, the tide of business improvement that has set in cannot be turned, although it may be retarded temporarily.

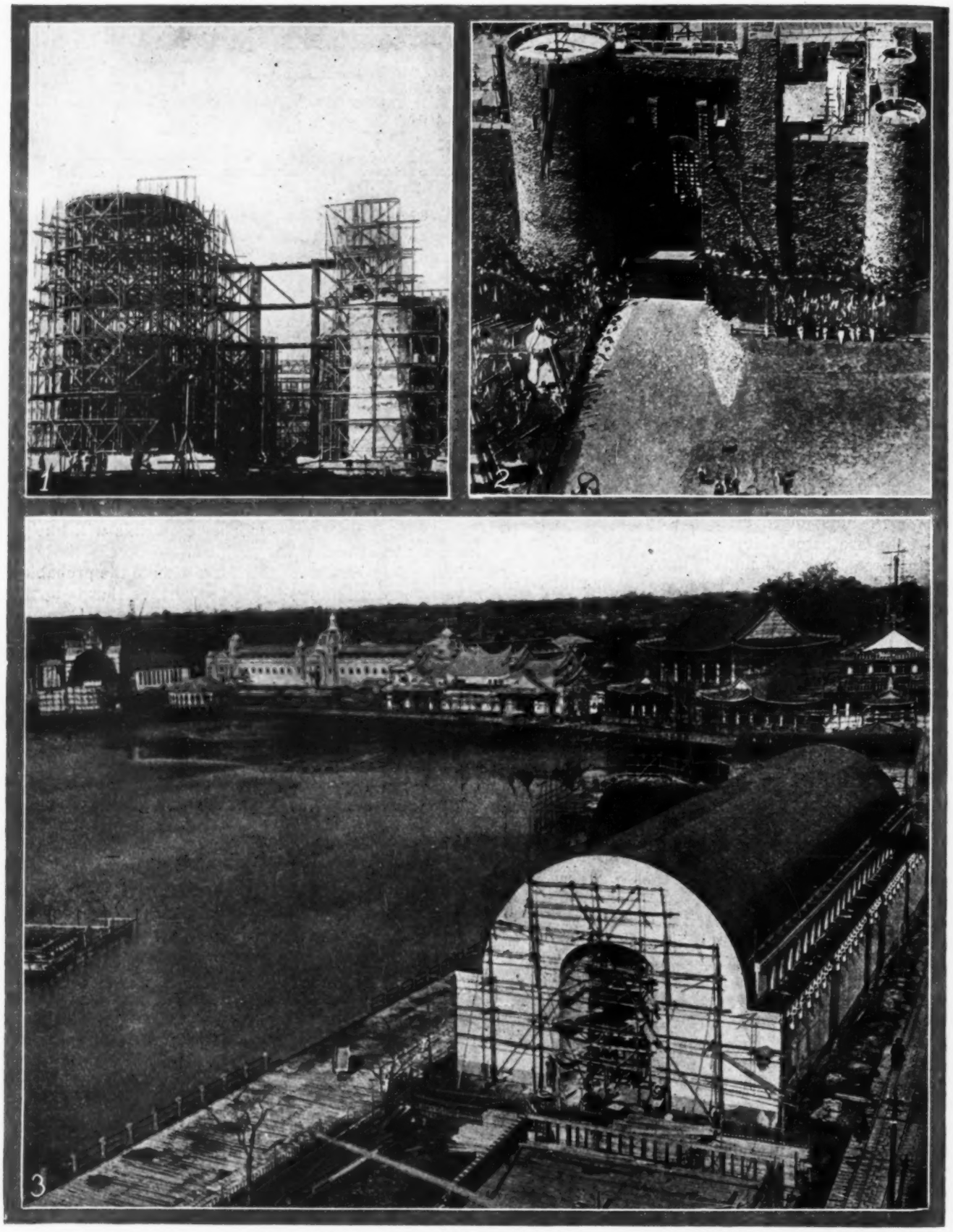
With these conditions in mind every construction manager should be looking ahead months instead of weeks on his material deliveries. Nearly all can solve their problems in some way. To sit by with a conviction that everything will work out all right would be childish.

"How Long, O Lord, How Long?"

A CERTAIN railroad recently hired a former shop employee to replace brasses on cars set out at various places on account of hot boxes. This man got together a crew of local labor and fixed up a lot of cars at 50 cents per set of brasses replaced. Under the union scale the railroad would have had to pay from $5.00 to $9.00 per set.

Any employer of building craft union labor can give plenty of similar examples. Except for the government, the railroads could make us pay through the nose for service. So could many other industries. How long can a few groups of laborers through joint action get several times what they are worth?

Play, Work and Worship

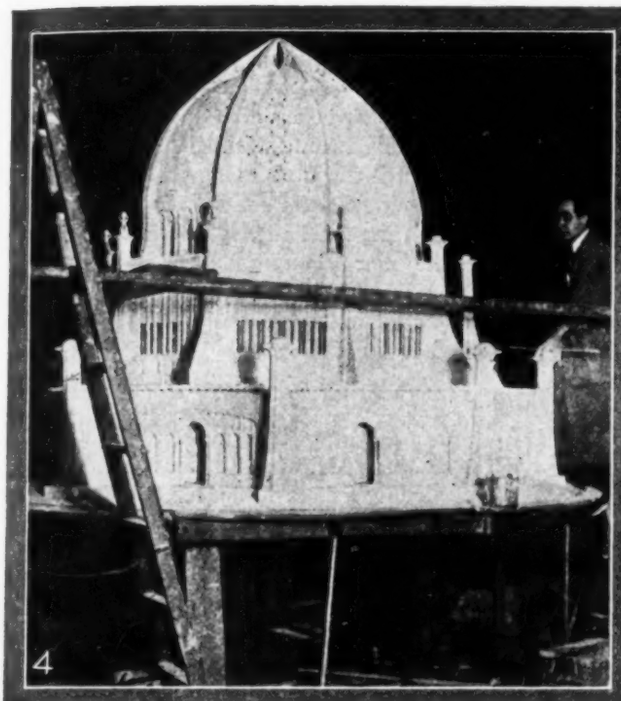


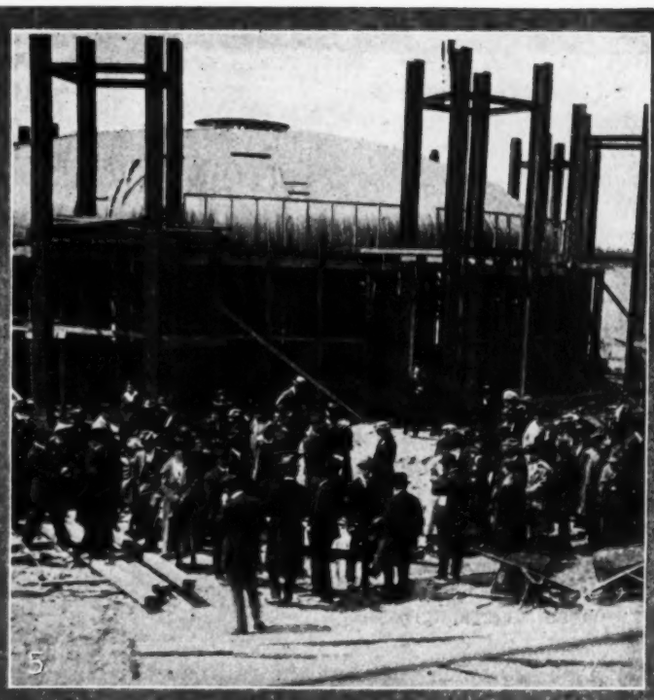
1—The movies are responsible for this structure, which is shown in process of construction on a California "lot." © *P. & A. Photos*

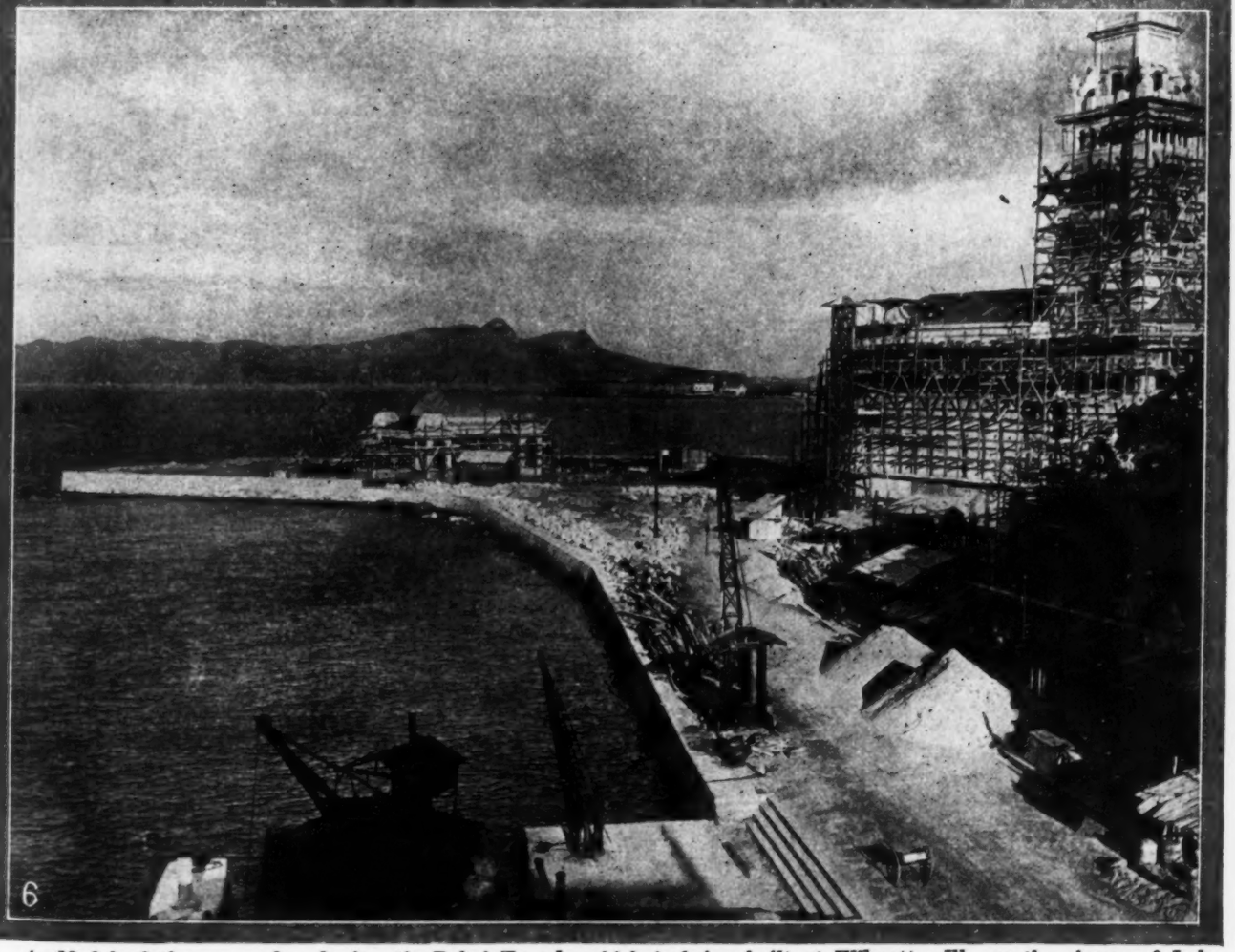
2—The finished product—a feudal castle—ready for the taking of the picture. © *P. & A. Photos*

3—Some of the buildings which form part of the Japanese peace exposition at Tokio. © *International*

Keep the Builders Busy







4—Model of the unusual and gigantic Bahai Temple which is being built at Wilmette, Ill., on the shores of Lake Michigan. © *International*

5—The foundations for the temple already are under construction. This photograph shows some of the work. © *International*

6—Getting ready for the Brazilian Centennial Exposition at Rio de Janeiro. © *International*

A MODERN TRANS-ANDEAN HIGHWAY

Seventy Miles of Improved Road at Elevations of from 12,200 to 16,000 Feet

THE Guggenheim interests recently opened for traffic in Bolivia a 70 mile highway which crosses the Andes Mountains at an elevation of about 15,000 ft. This road was built to provide access to valuable tin deposits near the summit of the main range of the Andes. It starts at a small railroad station 100 miles southeast of La Paz, the capital of Bolivia. The station is on the railroad which will become a trans-Andean route when a link now being built in Bolivia by American contractors is completed.

The elevation at the starting point of the road is 12,200 ft. above the sea. All the surrounding country is as high or higher than this, many peaks in the vicinity rising over 18,000 ft. above the sea and some to above 20,000 ft. The country traversed by the highway, therefore, literally is the roof of the world. The main range and many of its spurs in the vicinity are rugged and broken to a degree difficult to describe. Such plateaus as occur are treeless wastes on which only sparse vegetation can grow because of the altitude.

For about 20 miles out from the railroad the highway crosses a rolling plateau in which considerable trouble was occasioned by ground water and unstable soil. Areas of loose rock crossed in this section also made the use of road grading machines difficult.

Beyond the plateau the road rises over a summit of 13,650 ft. Thence it extends for some 15 miles through spurs of the main range. The ascent is next made to a divide in the main range at an elevation of 14,970 ft. Beyond this divide the line follows down the gorge of one stream and then up the gorge of another to a summit of about 16,000 ft. not far from the mine.

From the plateau to the mine the road is at all times in an immense mountain country. In several places it was built on precipitous mountain sides of sheer rock that required spectacular engineering. In spite of these conditions, satisfactory grades and alignment were obtained at reasonable cost.

Prior to the construction of the highway, which is known as the Caracoles Road, local transportation was entirely by pack train. Llamas were used almost exclusively for this purpose. These pack trains fol-

AN INSPECTION OF THE NEW HIGHWAY WITH THE PRESIDENT OF BOLIVIA AS THE GUEST OF HONOR

lowed well defined, and in some cases fairly well located main trails which had been in use for many generations.

The new highway will serve primarily the operations of the mining company. Traffic over the road

CUTTING THROUGH ROCK

consists at present chiefly of two-wheeled mule carts used in delivering supplies to the mine. The grade, alignment and surfacing of the road are such that motor trucks and motor cars readily can operate

AN AMERICAN GRADER ON THE JOB

over it. As the volume of traffic increases, it is expected that motor trucks will take the place of the mule carts.

The road also has been opened to the public. Pack trains have long carried fruits, vegetables and other temperate zone and tropical products from the eastern slope of the mountains to the towns and cities on the high plateau of the country. These trains find the road of particularly great value. Eventually it

A SECTION OF THE FINISHED HIGHWAY

PACKING SUPPLIES ON MULES ABOVE THE SNOW LINE

would be practical to extend the road down the east slope to tap a wonderfully rich part of the country which is now inaccessible. The construction of a railroad for this purpose would not be practicable, on account of the cost of construction and the limited traffic which might be developed.

Such vast undeveloped areas of great potential wealth occur in eastern Bolivia that description of them seems fantastic. These areas are so isolated by the Andes on the west and by great stretches of tropical wilderness to the east that the construction of railroads to tap them has never attracted capital. The opportunity of progressive development of such areas offered by motor truck highways is a subject which is claiming the serious attention of several Latin-American countries. It appears that this means of transportation may afford a method of opening up sections of great wealth in which a railroad would not pay for a long time.

The engineers of the Caracoles Road had in mind such an ultimate development. The location adopted by them could largely be used for a railroad should the traffic ever justify the construction of it. Consequently, this project is of far more than local importance. It will be one of several highway projects built to open up isolated areas, to tap which the construction of a railroad is not commercially feasible.

On account of the inaccessibility of the project and the conditions surrounding the work, most of the construction was done by hand. However, American road graders, rollers and other equipment were used wherever practicable. Native labor, most of which is straight Indian, was employed. Construction camps were located at various points along the line so that work could be prosecuted in several places at the same time.

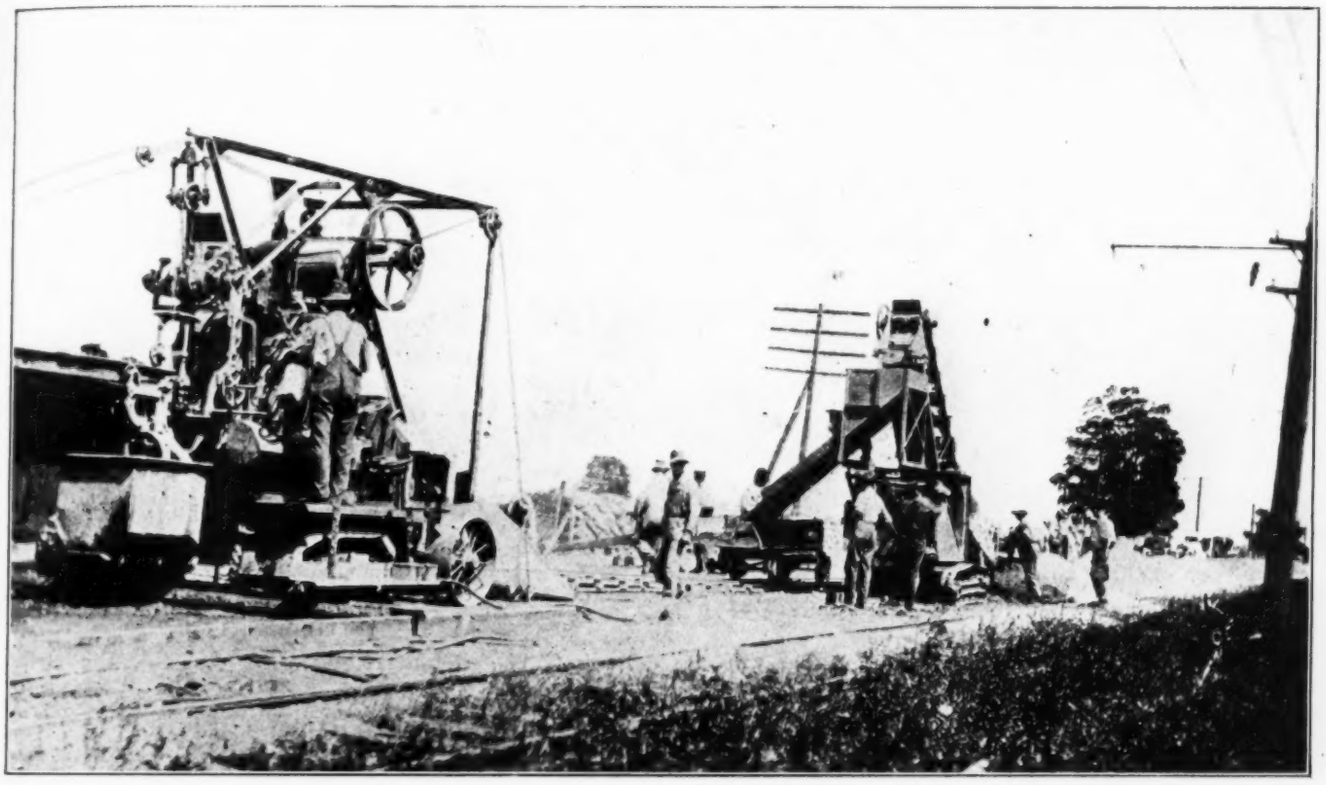
Horace Graham was General Manager of the project and A. L. Wilcox was the engineer directly in charge in the field.

CONSTRUCTION COMPANY INSURES HOME EMPLOYEES

THE group insurance plan by which all of its employees reporting to the central office are insured has been adopted by Dwight P. Robinson & Company. The amount of insurance depends upon the length of service with the company and the individual employee is permitted to name the beneficiary. The employees are insured regardless of their age and condition of health.

SPECIAL CHARGING CAR ON ROAD JOB

Indiana Contractor Keeps Paver Busy by Novel Method



ON a section of the National Old Trails road in Hancock County, Indiana, the C. M. Kirkpatrick Company of Indianapolis is using a rather unusual arrangement of equipment. The concrete pavement being constructed is 18 ft. wide, 8-in. thick at the center and 6-in. at the edges.

As originally used, the arrangement consisted of a small dump car pushed by hand over a short section of narrow-gage track which charged the mixer skip with one batch of sand and gravel.

This section of highway paralleled an interurban traction line on which the contractor had a gravel pit, and the sand and gravel for the job were hauled from the pit on the electric line in side dump cars which were unloaded directly on the subgrade. Thus alternate piles of sand and gravel were made along one side of the subgrade, leaving the other half open so that the trucks could bring in the cement and stock it on special skids along the opposite shoulder. These skids were fitted with special tarpaulin which protected the cement from exposure.

The method of handling the material after it had reached the subgrade was as follows: A section of 24-in. gage track 100 ft. long mounted on 2-in. by 6-in. wooden ties with a 2-in. by 4-in. wooden stringer along each edge was laid in the center of the subgrade with one end at the mixer skip. At the mixer skip, a 3 ft. section of track was hinged so that it could drop into the mixer skip when down and could be thrown back to allow the skip to be raised. This end of the track was raised about 15-in. above the subgrade so as to allow the low dump body to come to a position nearly vertical when dumped.

A special charging car was developed by the contractor from a chassis of an old flivver. The original power plant of this flivver, together with the transmission drive shaft and rear axle, were mounted in a new frame set on car wheels. The original rear axle was fitted with sprockets and acted as a jack-shaft having a chain drive to the rear car wheels. On this frame was mounted a very low, broad dump body so bound that it dumped itself when the catch was released. This small charging car ran back and forth on the 100 ft. length of track carrying the material to the mixer skip.

A loader equipped with a measuring hopper loaded, measured and dumped the gravel into the dump body. Three men shoveled the sand into 2 small boxes mounted on a wooden horse standing alongside the track. These boxes were hinged so that they could be dumped easily and quickly into the dump body. The flivver made the round trip, the entire 200 ft., in 1 minute. A single team with a single block moved the track ahead as the mixer was moved. The introduction of the loader saved the wages of 5 men and also speeded up production.

With this system the daily average pour in 10 hr. was 834 sq. yd. or 170 cu. yd. This means an average of a batch every 2 min. and 1 sec. A maximum of 1088 sq. yd. was laid in 10 hr. or 222 cu. yd. This is at the rate of 1 batch every 1 min. and 33 sec.

Ross Cox was in charge for the contractor.

HOIST HANDLES THREE-PLY JOB

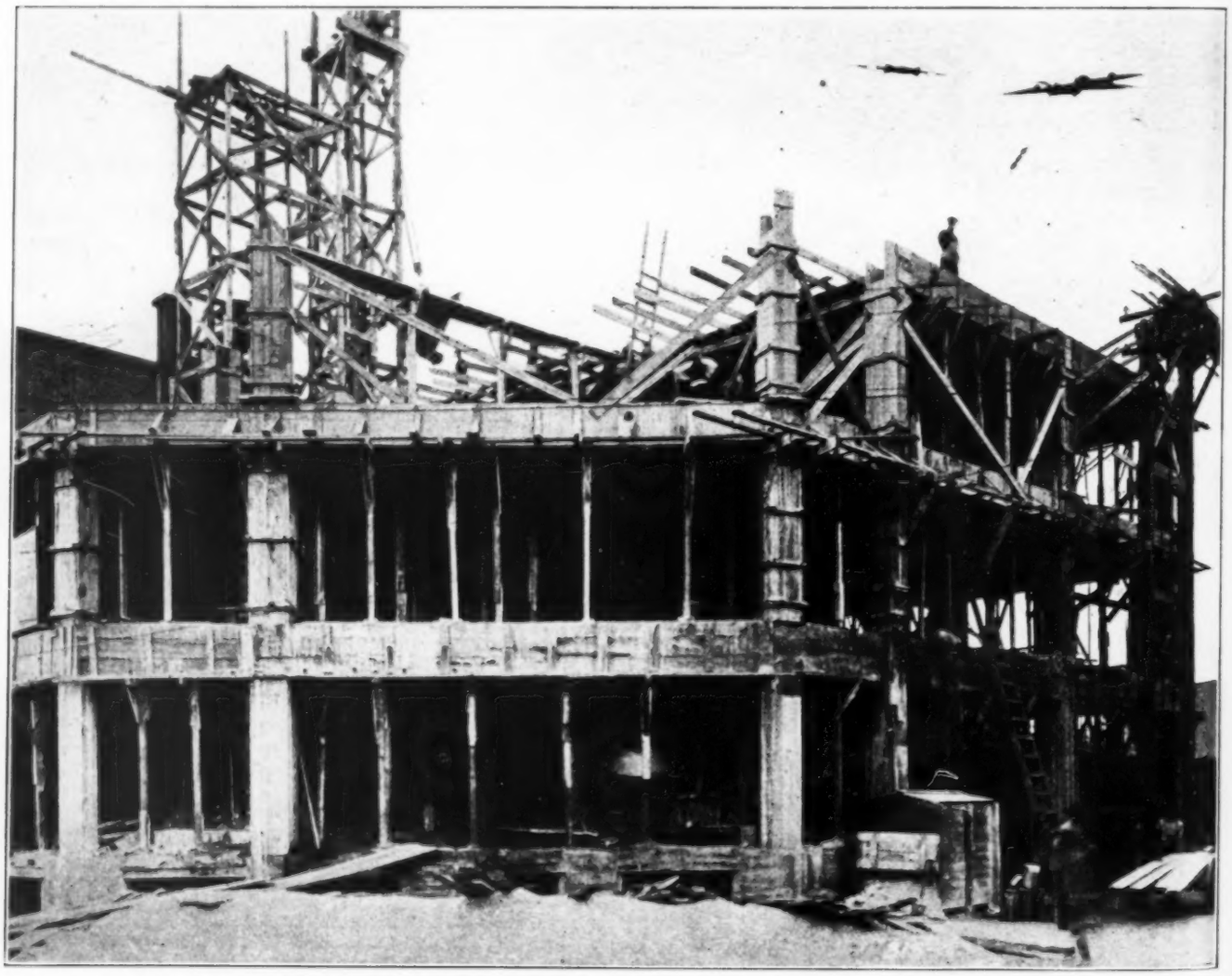
Runs Concrete Bucket, Elevator and Lumber Carriage on Warehouse in Chicago

ONE machine is doing triple duty on a 5-story fireproof warehouse being erected by Schmidt Bros. Construction Company in Chicago. A 20 hp. gasoline hoist, which may be seen in the lower left-hand corner of the upper photograph, is handling a ½-yd. concrete bucket, a double cage elevator and a lumber carriage. The lower photograph shows the elevator and concrete bucket towers at the left and the lumber carriage at the extreme right. The hoist is so arranged that the front drum of the engine takes care of the concrete bucket, the rear drum handles the lumber carriage, and the double cage material elevator is raised with the elevator sheave. The engine has been taking care of this three-cornered job in satisfactory fashion ever since the work on the building was started.

THE HOIST MAY BE SEEN IN THE LOWER LEFT HAND CORNER OF THIS PHOTOGRAPH

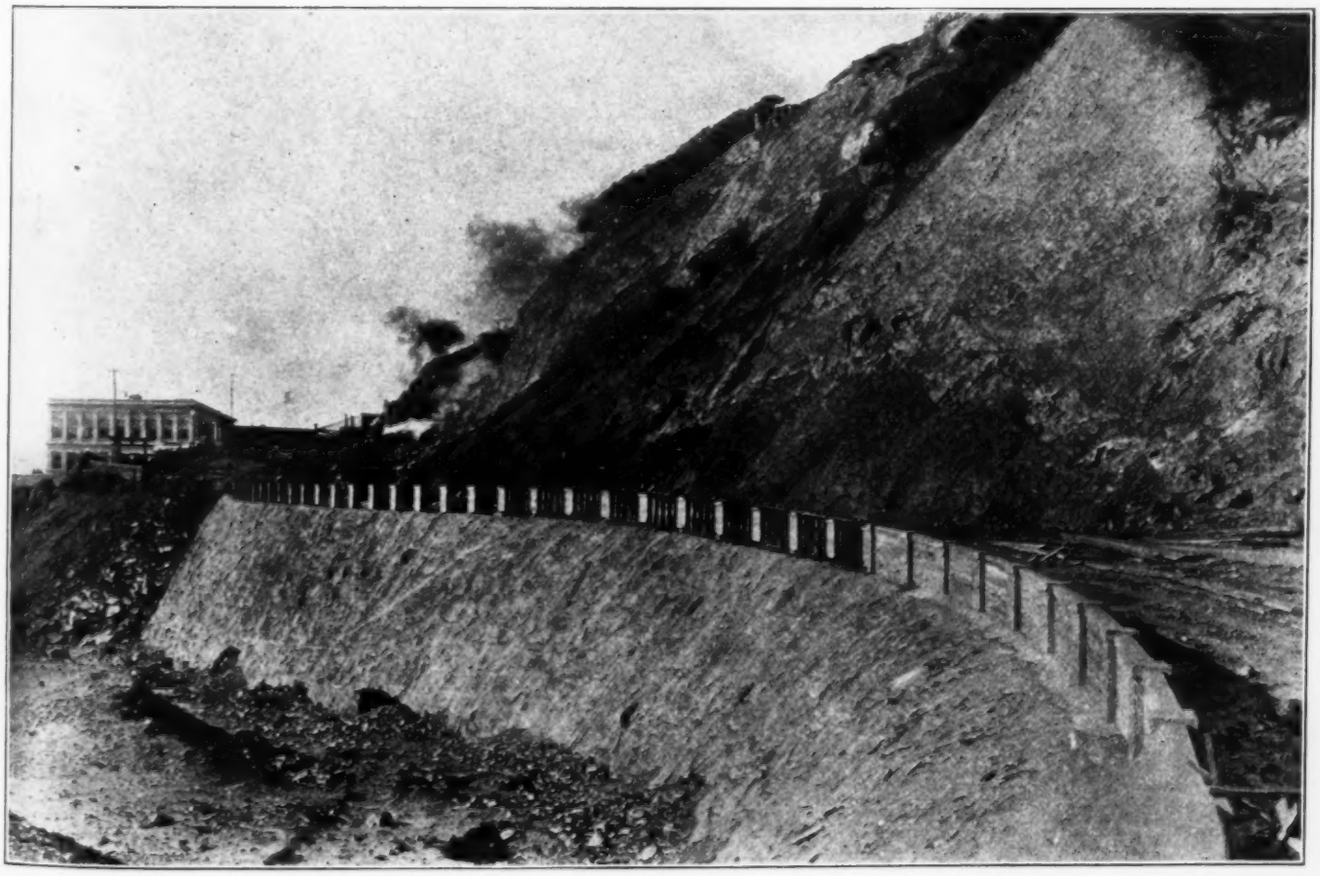
The use of gasoline engines for this sort of work is increasing steadily.

The sign which is displayed so prominently in the upper photograph shows that Schmidt Brothers belong to the class of contractors who are not afraid to let the passerby know just who is doing the work.



A GENERAL VIEW OF THE WAREHOUSE SHOWING THE SCENE OF THE HOIST'S LABORS

Extending San Francisco's Boulevard System Around Sutro Heights and By the Famous Cliff House



OHIO STATE STADIUM NEARING COMPLETION

Big Concrete and Steel Structure Will Seat 64,000 Spectators

THE gigantic stadium now being built by the Ohio State University at Columbus is nearing completion. When finished it will seat 64,000 spectators and be a two-deck affair, differing in that respect from nearly all of the college amphitheaters built in recent years. The total cost of the structure is expected to be $1,341,000.

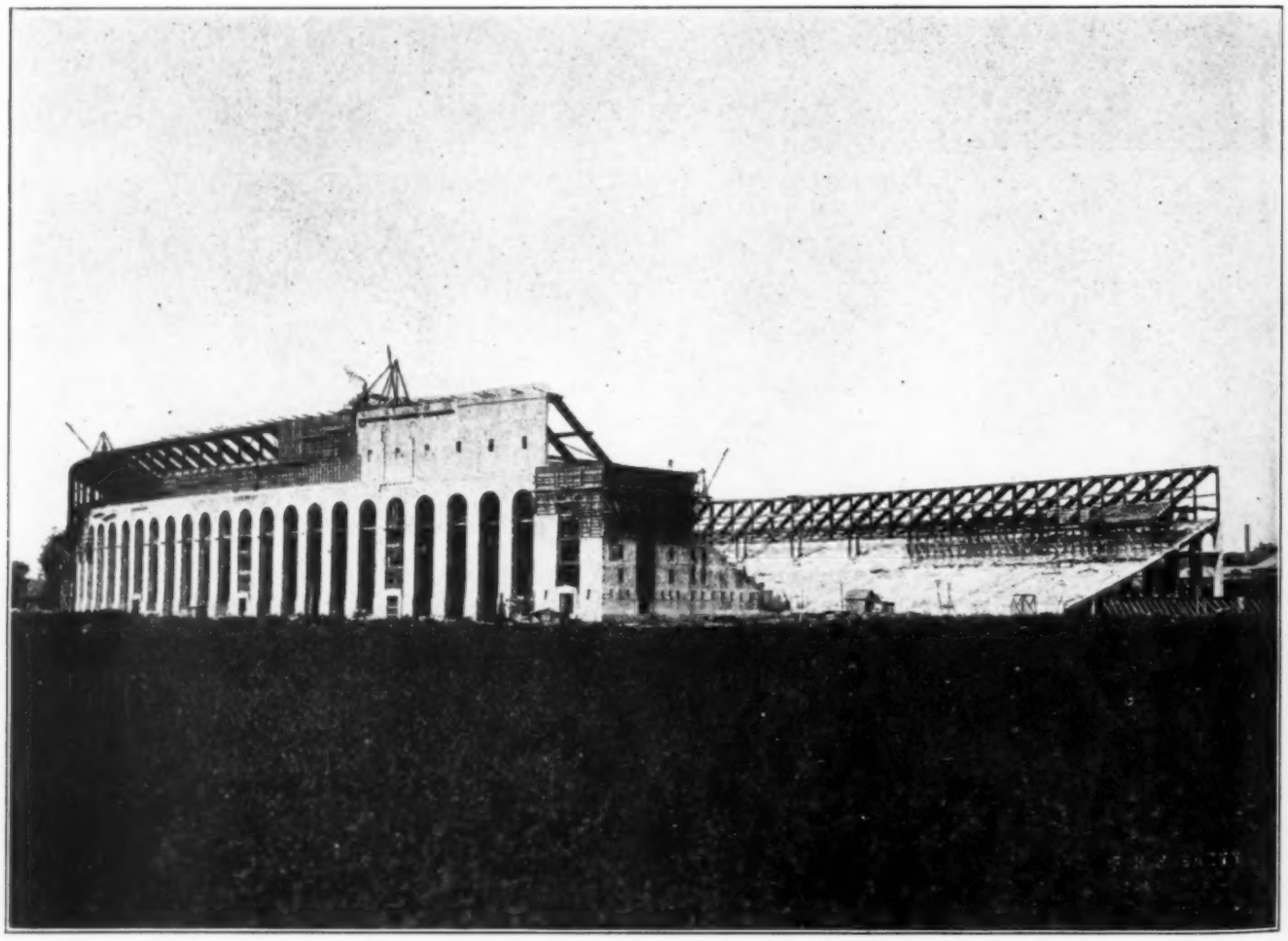
The stadium is built of steel and concrete and covers an area of approximately 150,000 sq. ft. Its unusual construction has brought about the use of many methods which have made for speed and efficiency.

Little chuting of concrete is being done, but instead narrow gage track with platform cars carrying two 1-yd. buckets and a gasoline locomotive are used to transport the concrete from the central mixing plant to the job. Four derricks, operating on tracks on the upper deck, raise the concrete to the discharge hoppers. The tail columns composing the arches on the outside of the horseshoe were poured in an easy way. Continuous forms were used in such a manner that as the concrete hardened they were pushed up to a higher level for the next pouring. The discharge hopper hung on the side of the column. The derrick lifted the mixed concrete from the cars below and discharged it into this hopper, and thus it fell directly into place. The hoppers were so constructed that they could be tied to the steel work at any place just above the forms and as the forms were raised the hoppers also were raised.

The main problem at the present time is the pouring of a reinforced concrete dome over the main entrance of the stadium. This dome is 70 ft. in diameter and 185 ft. from the ground. Chuting will be used in this feature of the construction on account of the inaccessibility of the derricks.

The original plans called for the support of the upper deck by columns placed around the seats of the lower deck. These columns would cause many undesirable seats by blocking the line of vision, so the plans were changed and the columns placed in the aisles which were run radially. Thus about 1000 seats of the lower deck were salvaged. These columns can be seen in the photograph of the uncompleted structure.

E. H. Latham, of Columbus, is the contractor. Prof. H. D. Smith, of the University, the architect, and Prof. C. T. Morris, also of the University, the engineer.

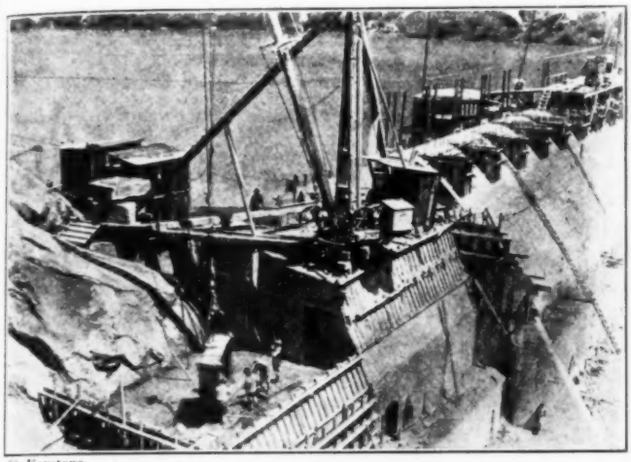


THE OHIO STATE STADIUM UNDER CONSTRUCTION

OUTWITTING THE FLOODS

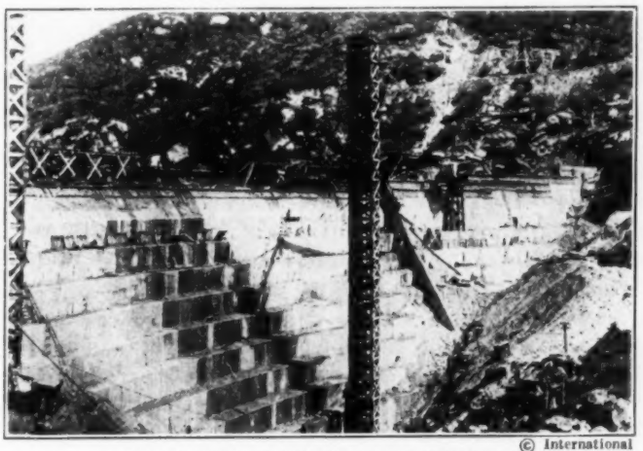
Skillful Engineering on Barrett Dam Kept Rising Waters from Stopping Work

WHEN the Barrett Dam was completed not long ago, the City of San Diego, Cal., for which it was constructed obtained not only a dam but a reservoir already filled with water. In fact, the value of the water caught and impounded in the reservoir this season is greater to the City of San Diego than the entire cost of constructing the dam itself. This was due to the engineering skill of Henry N. Savage, who had charge of the work.

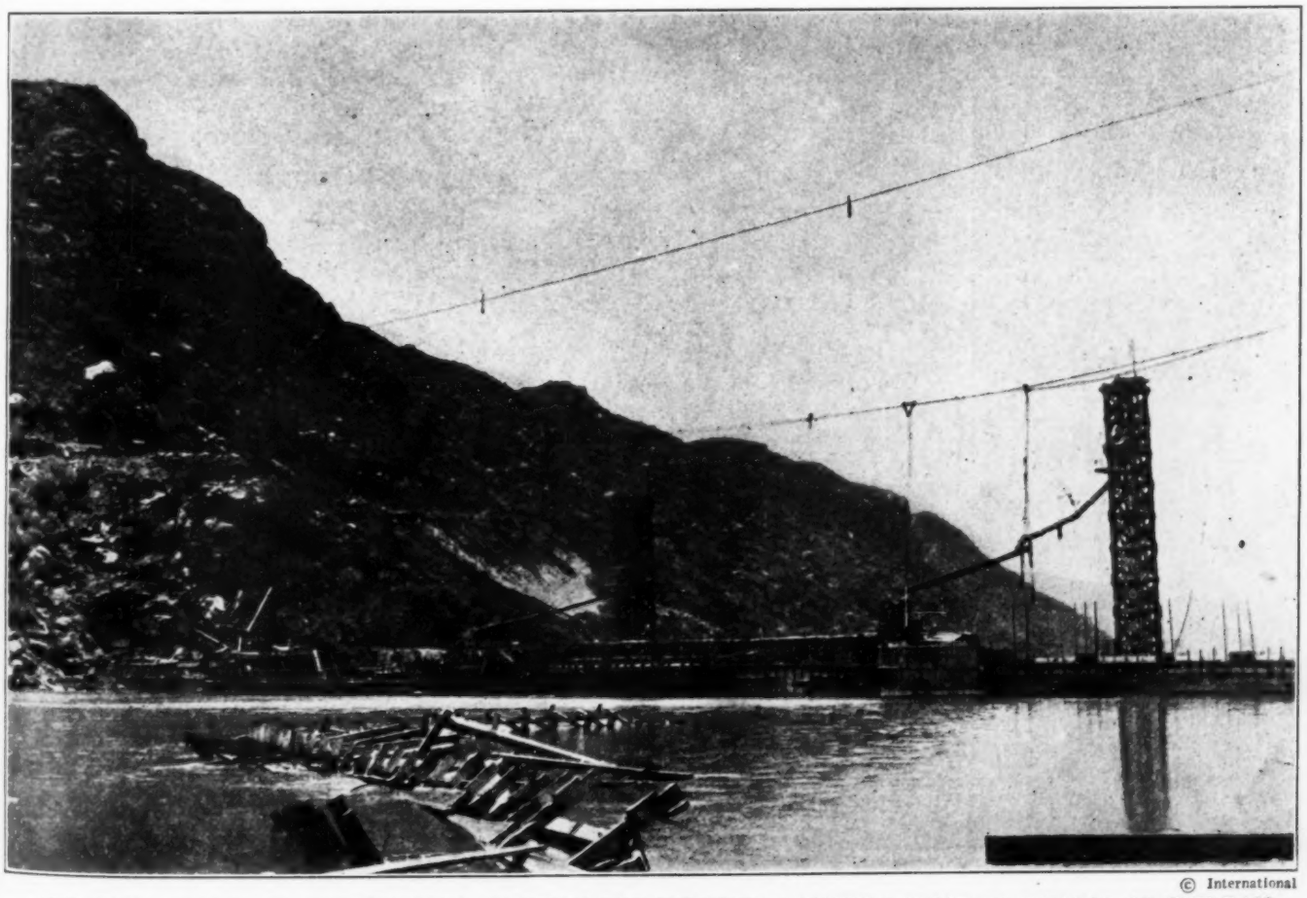


© Keystone
A VIEW OF THE DAM FROM THE HILLSIDE

The construction of the dam had been advanced sufficiently before the winter rainy season to provide storage for something over the average run off from the drainage basin. The rains, however, were unusually heavy, amounting to nearly twice the average and being the second heaviest in the 74 years that rainfall measurements have been recorded in California. This, of course, complicated the problem which confronted Mr. Savage, but by working three shifts and frequently by erecting the upstream forms



© International
CONCRETING THE FACE OF THE DAM



© International
THE FINAL STAGES OF CONSTRUCTION, SHOWING THE IMPOUNDED WATERS CLOSE TO THE TOP OF THE DAM

and pouring a diagonal of concrete against them, it was possible to keep the water, from overtopping the dam although at times the water was 10 ft. higher in the reservoir than the concrete at the downstream face of the lower sections.

Beginning with the flood of December 25, 1921, and continuing up to the completion of the dam, there was never a time when the water in the reservoir was not above the lowest portions of the masonry being placed in the top of the dam. Nevertheless, no water overtopped the dam and at the time the masonry was poured to the fixed lip of the spillway to 100 per cent, the water in the reservoir was impounded to about 103 per cent, being held back by temporary stop plank placed between the piers of the overflow spillway section.

THE RAFT METHOD OF TANK CONSTRUCTION

TO speed up the inside work on the erection of a 1,000,000 gal. steel tank 130 ft. in height, as well as afford protection for the workmen, the Chicago Bridge and Iron Co., which is doing the job for the Monmouth County Water Co. at Asbury Park, N. J., is using a floating scaffold carried on empty barrels.

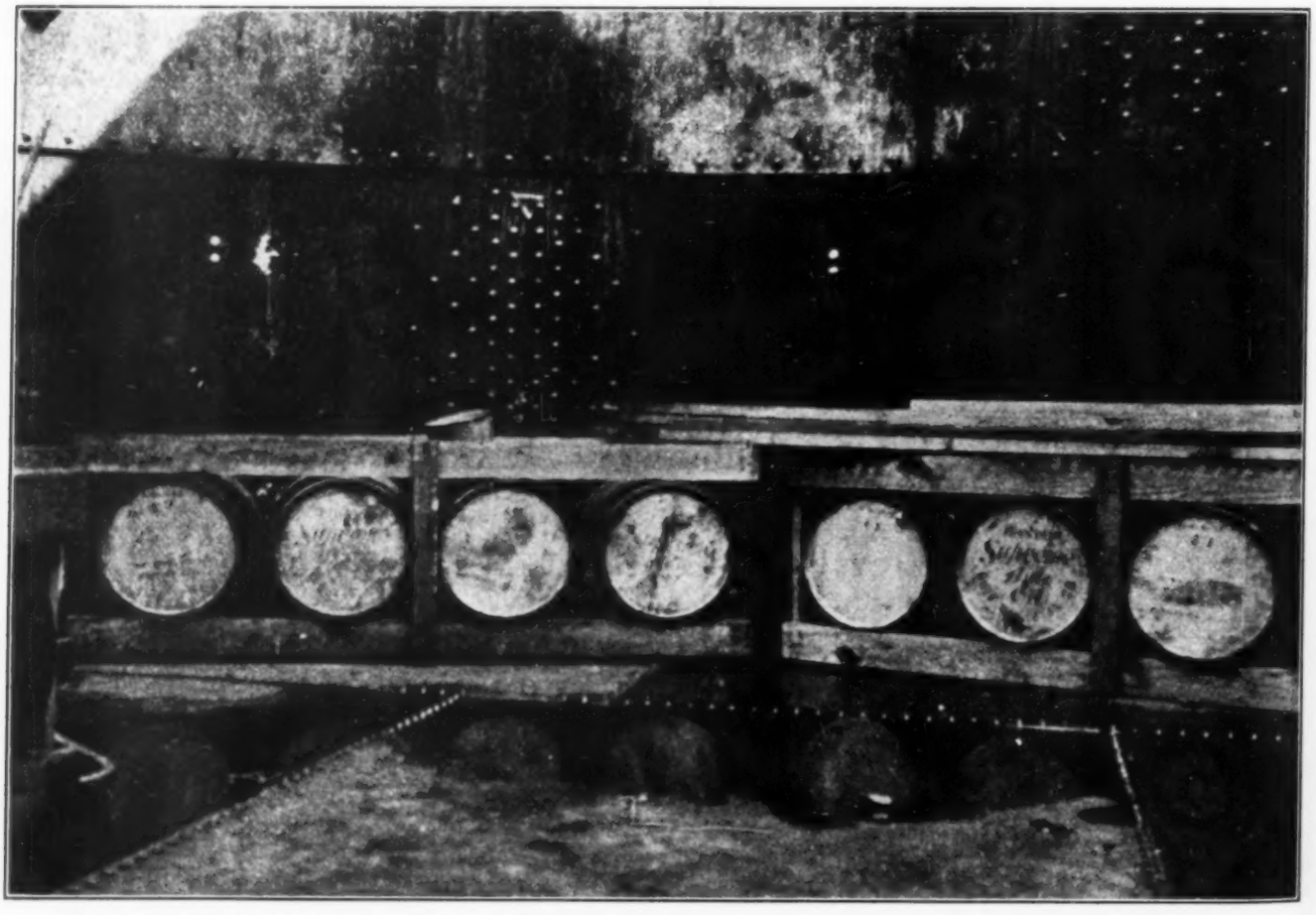
After the tank reached a height of about 30 ft. water was turned in and the scaffold floated. The scaffold allows the riveters to work; makes the job of moving the gin-pole easy and prevents the men from falling, as there is nowhere to fall.

The tank which is 35 ft. in diameter is made up of sheets 6 ft. by 20 ft., each weighing about 2½ tons. These sheets are raised by means of a gasoline hoist and a gin-pole. The pole frames into the sheets. Two stiff legs or braces also frame into bolt holes of the sheets. On the outside a rolling cage carries the heater and bucker-up. There are 6 sheets to a ring and the record days progress was 2½ rings.

The scaffold will also be used in painting the inside of the tank. Starting at the top a strip of about 7 ft. will be painted; water will then be lowered about 7 ft. It will be necessary to wait about 30 min. for the surface to dry when the operation will be repeated.

The tank was started about June 1. Steel erection was completed July 18 and the job will be completely finished by the time this appears in print.

The illustration shows the barrels which make up the raft or floating scaffold as they looked before water was admitted to the tank.



THIS PHOTOGRAPH SHOWS HOW THE RAFT OR FLOATING SCAFFOLD WAS BUILT INSIDE THE TANK

A NEW IDEA IN DOCK CONSTRUCTION

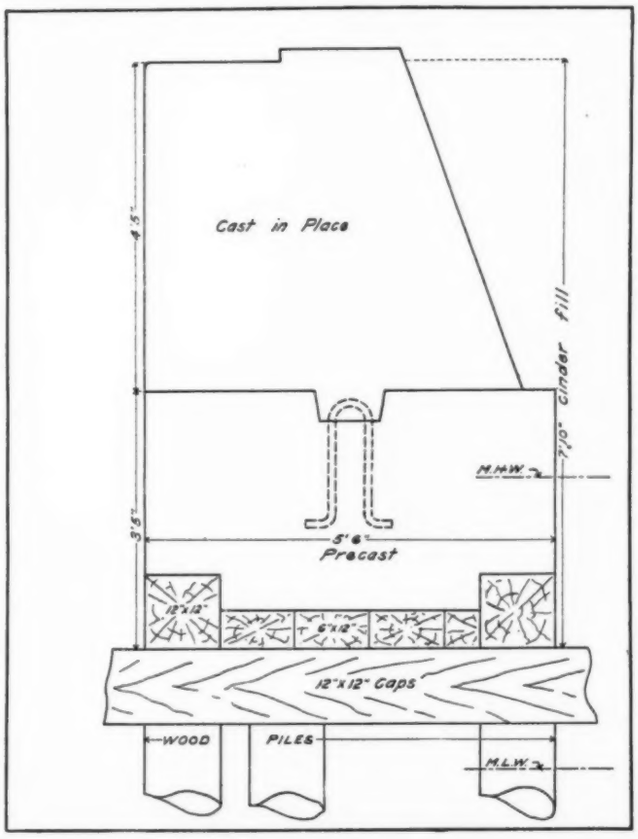
Precast Concrete Pedestals Are Used Below Water Line

TO build a pier which will be nreproof, at least so far as the substructure is concerned, is the aim of the Erie Railroad, whose burned Weehawken Piers are now being rebuilt by Foley Bros. General Contractors.

Resting on the splined deck (the decking and pile driving was described in the May issue of SUCCESSFUL METHODS) is an 8-ft. fill of cinders. Also resting on the timber deck are the concrete foundation walls and pedestals which are to carry the two-story shed which is to be of timber construction. Should another fire occur, the sheds would merely burn down to the cinder fill and the foundations would remain intact.

The concrete walls and pedestals below the water line are made up of precast concrete blocks, which are later set in place by means of a derrick boat or locomotive crane. The blocks contain about 3 cu. yd. and weigh about 6 tons each. By precasting, the concrete is allowed to cure for a period of 60 days before placing and it is thought that such curing will prevent any damaging action of the salt water. The photograph shows the blocks in place, the sketch shows how the blocks rest on the spline deck and how they are keyed to the next course which is poured in place.

In the background of the photograph may be seen one of the pile drivers in position for driving fender piles. For vertical piles, the A-frame swings back allowing the top of the leads to swing outward into a vertical position.



HOW THE PEDESTALS WERE PLACED

A GENERAL VIEW OF THE PIER SHOWING THE PRECAST PEDESTALS IN POSITION

NIGHT AND DAY WORK ON ROAD JOB

Two Shifts Are Kept Busy on 58-Mile Project in Illinois

By A. F. Deaney

ONE of the biggest and best-equipped road-building jobs in the Middle West is being done by the H. H. Hall Construction Company of East St. Louis, Ill. The contract calls for the building of 58.7 miles of concrete road, the slab to be 18 ft. wide, reinforced, and 7 in. thick, with a 2-in. crown. The road begins about 3½ miles north of Okawville, Ill., and runs in a southeasterly direction, connecting the towns of Okawville, Nashville, Ashley, Tamaroa, Duquoin and Carbondale.

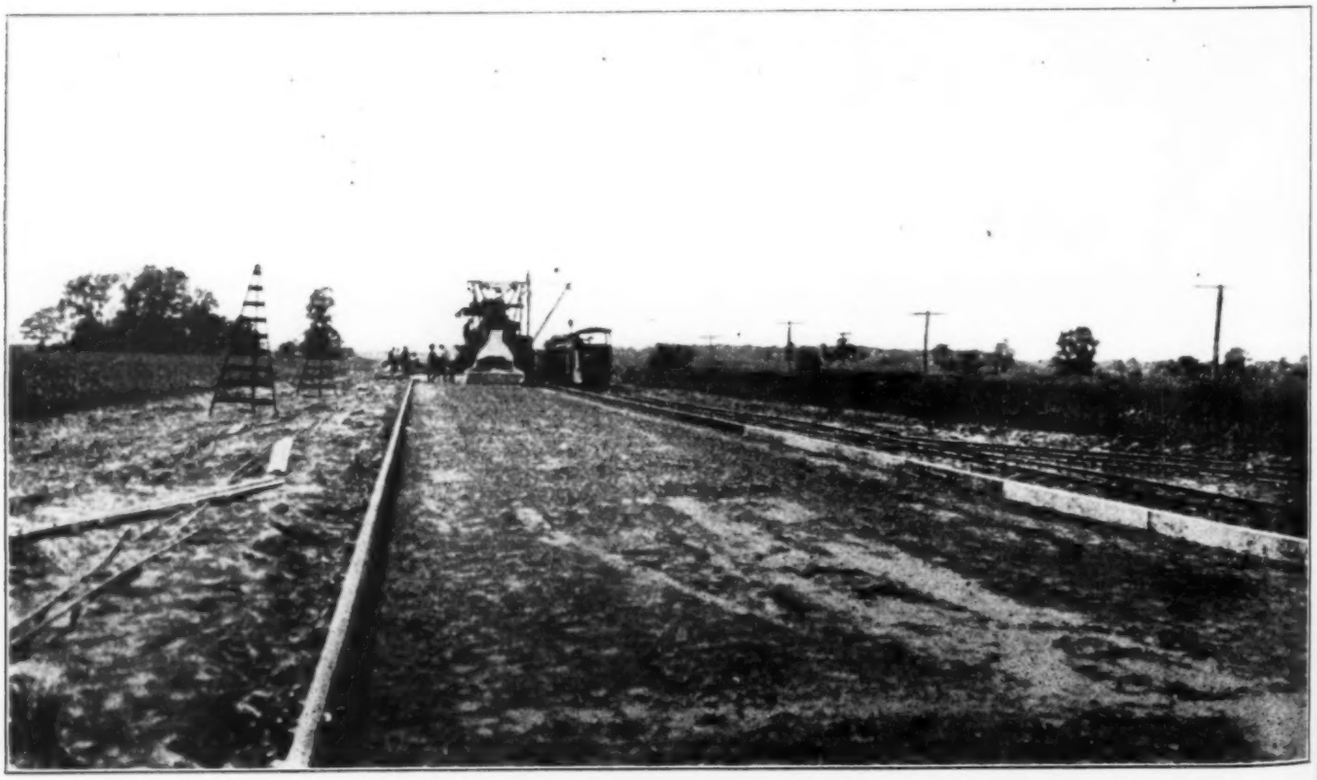
The first material setup was established at Okawville and a second one at Ashley was begun before work was completed at the Okawville setup, so that all delay due to moving the setups would be eliminated. When the Okawville setup is no longer in use it will be moved to Nashville. Approximately 10 miles of road will be built from each setup.

The job is extremely well organized and the work is being handled in two 10-hr. shifts. During the first two months of work, in spite of some unfavorable weather, about 8 miles of concrete were poured. The day shift, at last reports, was making progress at the rate of 650 to 735 lin. ft. of pavement a day while the night shift was pouring from 500 to 596 lin. ft. The equipment consists of two pavers followed by finishing machines. The pavers are supplied by industrial cars running from the unloading point.

To handle its industrial cars the company uses 13 miles of 24-in. narrow gage track with special 50-ft. radius switches which permit fast moving in switching. The rolling stock consists of 270 cars, each of which carries 2 tipover batch boxes holding a 5-sack mix and equipped with cement compartments. There also are 25 cars used for general work such as hauling track as well as steel, etc. The motive power is furnished by 10 locomotives of various types, both gasoline and steam being used.

The material yard is well arranged, the aggregates being unloaded by three locomotive cranes from spur tracks on the Louisville & Nashville Railroad and dumped on a tunnel 320 ft. in length equipped with tunnel traps. This tunnel is whitewashed inside, is electrically lighted, and ventilated by two 30-in. direct-connected, motor-driven blowers. The cement is stored in a house which has a capacity of 19,000 bbl. Only sack cement is used.

One of the unusual features of the job is the camp which with the material yard covers about 35 acres. There are 25 bunkhouses 25 by 20 ft., each containing 8 double-deck bunks. There also are 2 combination kitchens and dining halls and a commissary and time office arranged somewhat like a country store. There are two tool and machine-part store rooms, 2 corrals, each with a portable stable 30 by 72 ft., having a capacity for 32 head of horses, a feed storage building, a horse hospital, a blacksmith shop and a portable machine shop on wheels. A private telephone line about 13 miles long keeps the road crew in touch with the office and camp at all times. All of the buildings, tunnels, cement sheds, etc., are made



THE PAVER ON THE JOB. AT THE LEFT ARE TWO OF THE TRIPODS USED TO CARRY THE LIGHTS FOR NIGHT WORK

THIS CEMENT SHED HAS A CAPACITY OF 19,000 BBL.

in sections bolted together and can be taken down and set up again when the setup is moved.

D. B. Harper, mechanical superintendent for the H. H. Hall Company, is responsible for the design of these buildings. They were built in the company's own shops under his supervision. In addition to supervising the construction of the camp Mr. Harper designed much of the equipment in use on the job. It is almost impossible to go anywhere about the work without coming across some piece of special equipment designed by him. He seems to have taken care of every contingency and one of his products to which the men point with pride is the lighting plant for the camp. It consists of a 12½ K. W. generator, direct connected to a 6-cylinder automobile motor set on a common base with an auto radiator and gasoline tank. This furnishes the light for the entire camp.

The night shift, in addition to the actual paving, does all of the subgrading and formsetting, the dirt for the forms being removed by a form grader.

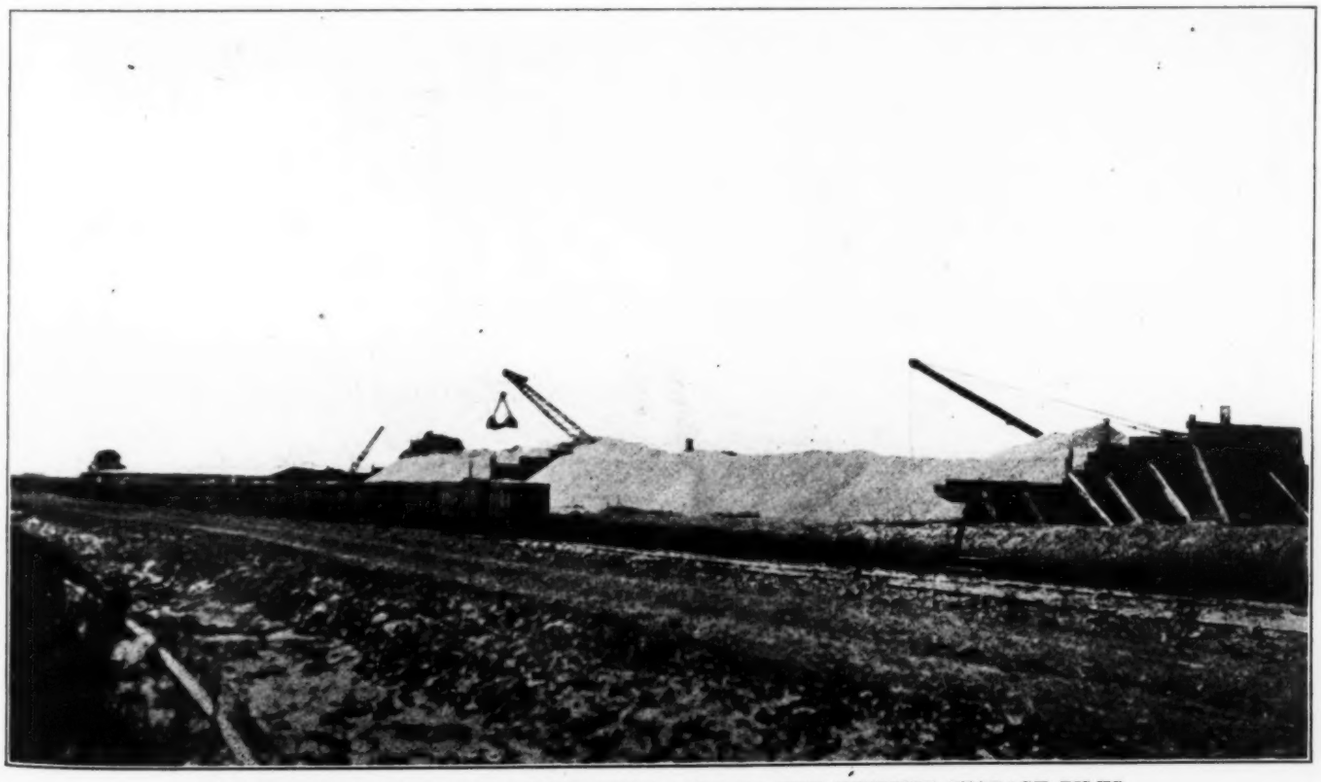
Four lighting plants are used for the night work, a string of lights being supported by tripods at one side of the grade, thus illuminating the subgrade. In addition, two floodlights are focused on the mixer and one on the finisher. During the day the lamps are removed from the sockets on these lights, and the wires are wound up on a spool mounted on trucks with the plant and the outfit moved ahead. The

TYPICAL SECTION OF THE WELL ARRANGED CAMP

tripods fold up compactly so they also can be moved easily. The paver also is equipped with a generator and battery which furnishes current for extra lights on the machine.

The use of two shifts is proving extremely satisfactory. As pointed out above, certain operations, such as subgrading and form setting, are performed only at night, leaving the way clear for the day shift to put in all of its time in actual laying of the concrete. This, of course, increases the general efficiency of the work and eliminates the holdups which often occur when both operations are progressing simultaneously.

The superintendent in charge of the work is F. J. Glasner and the resident engineer for the State is E. E. Ashlock. About 300 men are employed.



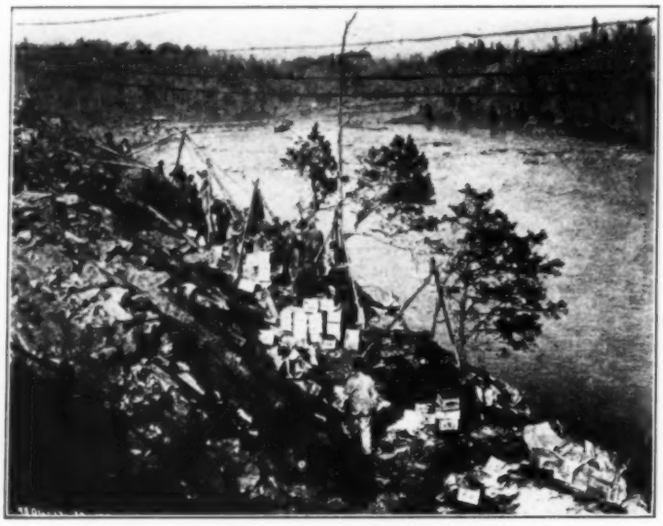
TRANSFERRING SAND AND STONE FROM CARS TO THE IMMENSE STORAGE PILES

GETTING MATERIAL FOR THE MITCHELL DAM

Single Shot Makes 65,000 Tons of Rock Available for Construction of Dam in Alabama

By R. S. Arthur

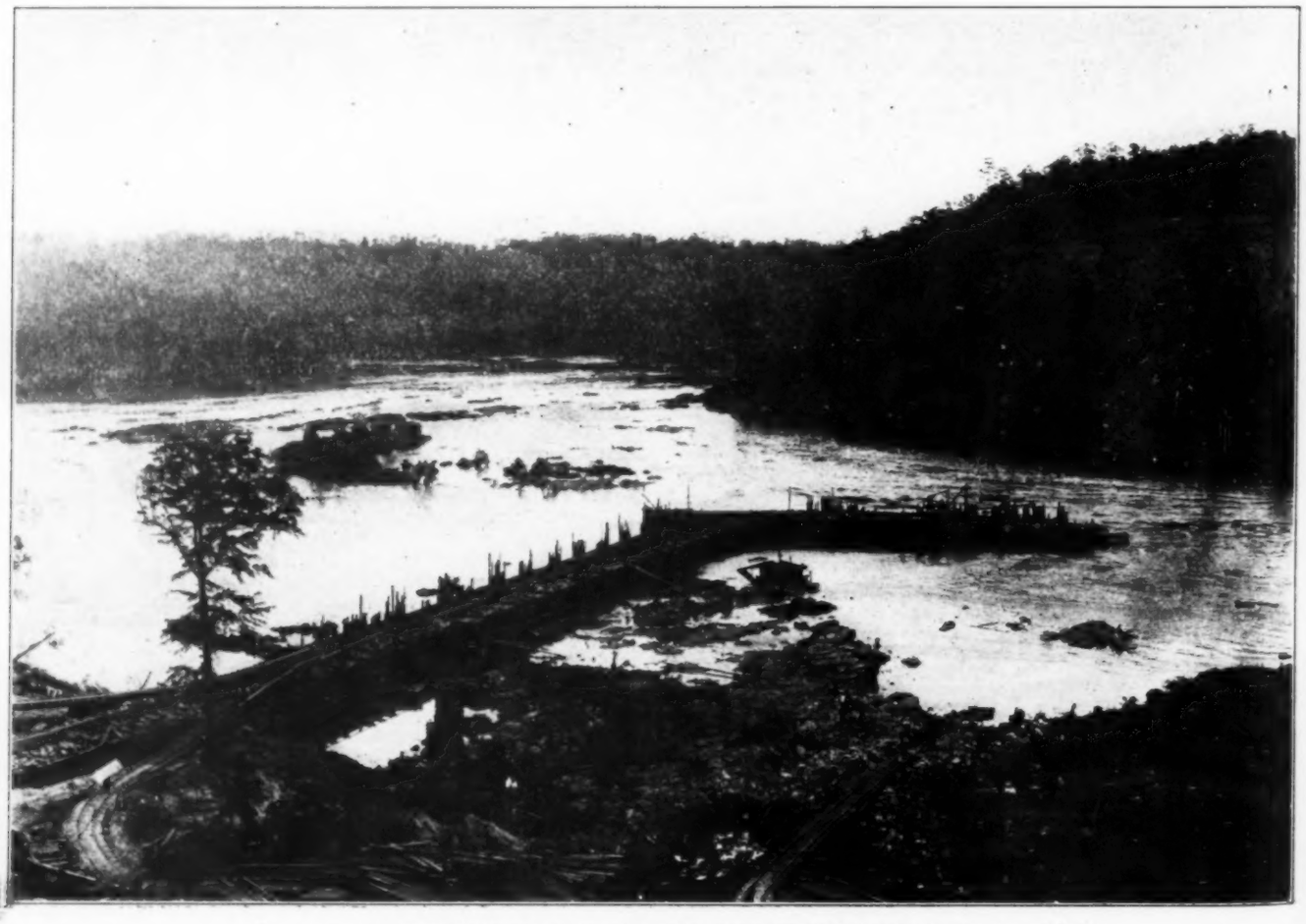
SIXTY-FIVE thousand tons or nearly half of the total amount of rock required for the construction of the Mitchell Dam which the Dixie Construction Co. is building for the Alabama Power Co. at Mitchell, Alabama, were made available by a single shot which was considered one of the most successful ever made in the South.



PREPARING FOR THE BIG BLAST

About 3000 ft. down stream from the dam site there was a natural bluff rising to a height of about 160 ft. and extending for a considerable distance almost parallel to the river. After considering all possible means of getting the great amount of rock necessary for the construction of the dam, it was decided to open up a quarry at the site of this bluff. An examination showed the stone to be hornblende, the strata horizontal and no stripping required.

In order to have a large amount of good stone available with which to start the dam, it was decided to make a quarry face of good stone and a quarry floor with the first blast. Two well-drill machines were started on the upstream end of the bluff as near the face as it was possible to locate them. Later two more well drills were added and eighteen holes were drilled from the top of the bluff. These holes, 6 in. in diameter and from 130



THE MITCHELL DAM FROM THE RIVER BANK

to 160 ft. deep, were placed on an average of 18 ft. centers. This close spacing was necessary on account of the heavy burden on the bottom of the holes. At the other end of the bluff the burden at the top was 75 to 80 ft., so one well-drill machine was lowered over the face by means of a gin-pole and 5 holes were drilled in a sub-bench on 20 ft. centers and 60 ft. deep.

These 23 holes were loaded with dynamite. Seventy-five per cent gelatin dynamite was loaded in the bottom of each hole, then 60 per cent ammonia dynamite and 40 per cent ammonia dynamite near the top of each hole. All the dynamite was loaded in 4 by 8 in. cartridges, split and well tamped down. In the 18 deep holes in the back row, from one to three spaces of clay tamping were used to divide the charge near the top. All 23 holes were detonated at one time 25,000 lb. of dynamite being used.

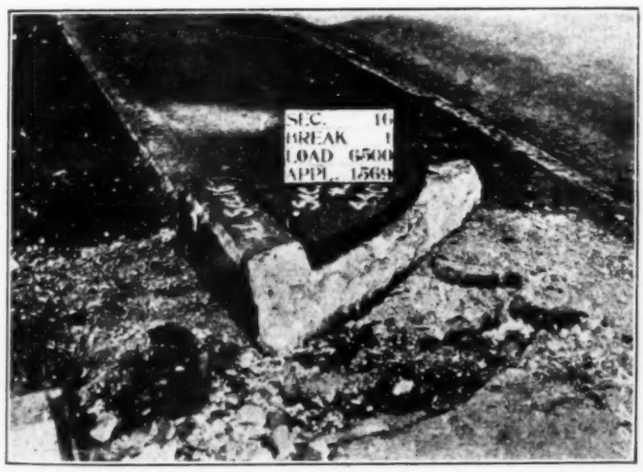
The dam which is located on the Coosa River, 60 miles south of Birmingham, Alabama, is now well under way. O. G. Thurlow is chief engineer and Henry L. Myers superintendent of construction. H. H. Hamilton was in charge of the shot.

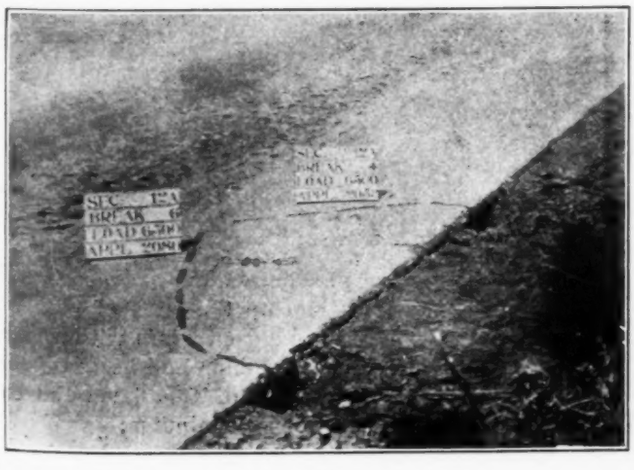
NORTH CAROLINA HIGHWAY DEPARTMENT TO USE RADIO

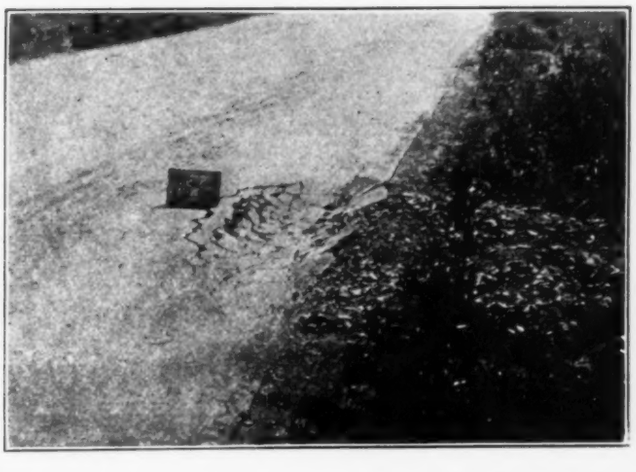
STATE Highway Commissioner Frank Page will have installed in his office in Raleigh a radio broadcasting station, and receiving stations in each of the nine district offices located at Tarboro, Kinston, Wilmington, Durham, Greensboro, Charlotte, Elkin, Marion and Asheville. With this equipment the administrative forces of the Commission will be able to get in immediate touch with the construction and maintenance engineers throughout the State and thus effect a saving of several hundred dollars per month in telegraph tolls and in stenographers' services.

This is an innovation in highway work as no other State has used radio for this purpose, and North Carolina will be the pioneer State to use the wireless telephone in carrying out an extensive road building program. While in Washington a short time ago Commissioner Page was offered this radio equipment which is a part of the surplus war material which is being allotted to the various States and, realizing the tremendous advantage to which it could be used in the work he immediately accepted the offer. In this way the equipment will be secured without cost to the State except for the cost of installation, which is negligible. Work of installing the broadcasting and receiving sets wil begin within a short time, and the new system will soon be in operation.

TYPICAL FAILURES ON BATES EXPERIMENTAL ROAD







STEEL LEADS KEEP HAMMER STRAIGHT

TO keep a steam hammer resting straight on the pile is sometimes a troublesome proposition. To avoid this trouble and to reduce the amount of guying required, the Penn Bridge Co., which has the contract for building the new Shark River bridge along the ocean front at Belmar, N. J., is using a set of steel leads as shown in the accompanying illustration. The leads which are then designed and constructed by the Penn Company's engineers are unusual for steam hammer work and consist of 12-in. channels with 5-in. channel guides. The total length of 60 ft. is made up of two 25 ft. and one 10 ft. sections. For driving short piles, short sections are used and leads lengthened for longer piles. The piles shown in the picture are 45 or 50 ft. in length.

MAKING CONSTRUCTION SAFE

THE General Contractors Association of Cleveland is helping out in the safety campaign by distributing small cards which reads as follows:

Safety First

Build staging carefully—have proper regard for the safety of your fellow workmen.

Fifteen workmen were injured in the State of Ohio in the month of May by objects thrown by other workmen.

Do not remove guardrails or other safety devices without instructions from the foreman or superintendent.

When cutting lumber do not let ends drop to the floor below.

Drive nails full length. Protruding nails and bent nails are the source of many injuries.

Be careful not to overload staging with material.

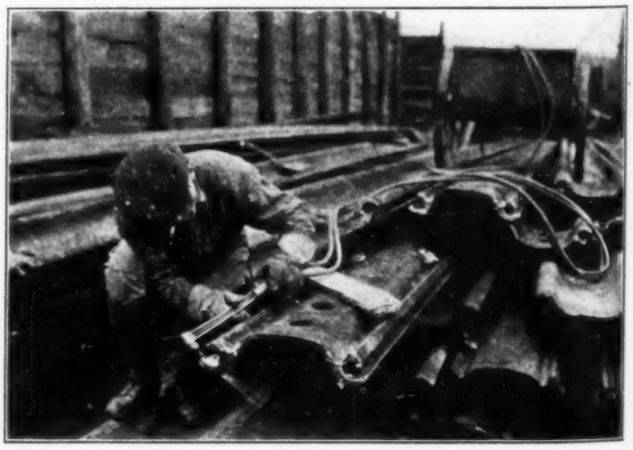
This sort of campaign especially the definite figures on the number of men injured in the State during a given month always attracts attention and does good.

HANDLING ROAD FORMS AHEAD

THE photograph below shows how a "hay-burner" attached to a "mud boat" handles steel road forms on an Illinois road job. Ten sections generally constitute a load. The photograph shows the two men required to throw the section off.

TRIMMING STEEL SHEATHING

THE oxy-acetylene flame, together with the later designed oxy-electric torch, are daily being put to work ever varying ways. Only recently the latter was used in submarine work in New York Harbor to cut away a broken section of cast-iron water main in 53 ft. of water.



The above photograph shows how a contractor is using such a flame to trim up the ends of old steel sheathing so that they can be used again with a minimum amount of driving. The ends had become badly blunted and bent. By means of the flame the end of a pile is restored in about 2 minutes.

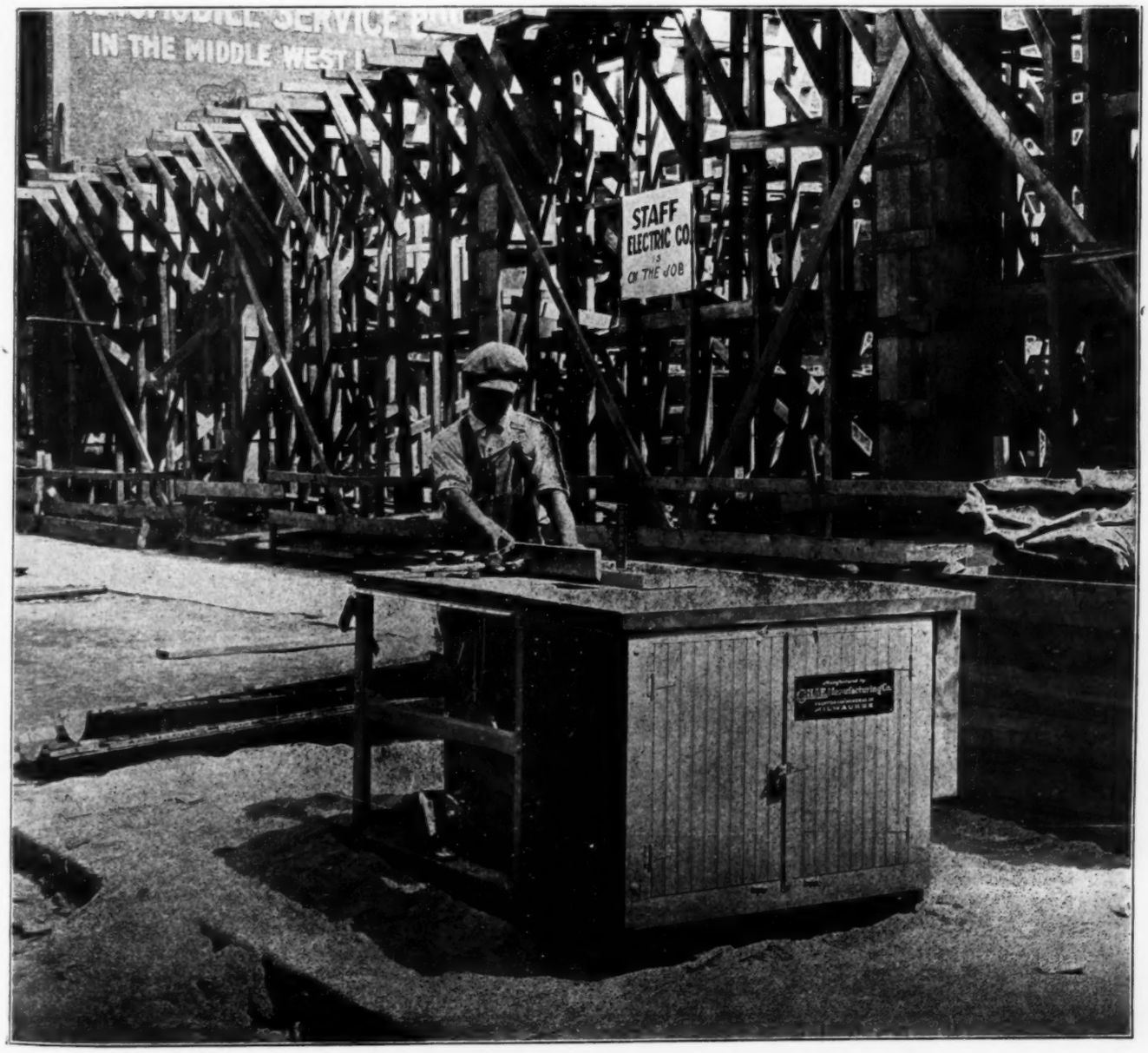
C H & E

Saw Rigs, Pumps, Hoists, Elevators and Engines

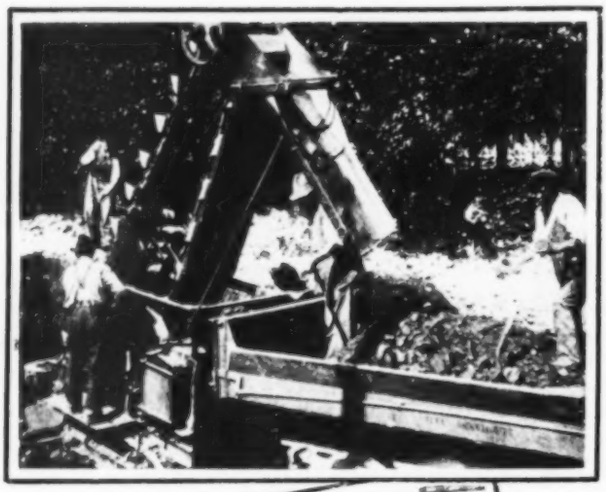
Write for Our New Red Cover Catalog

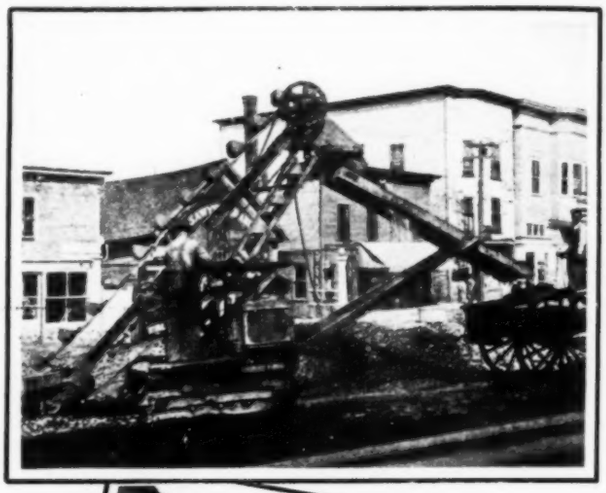
C. H. & E. Manufacturing Co., Inc.

384-A CLINTON ST. MILWAUKEE, WIS.

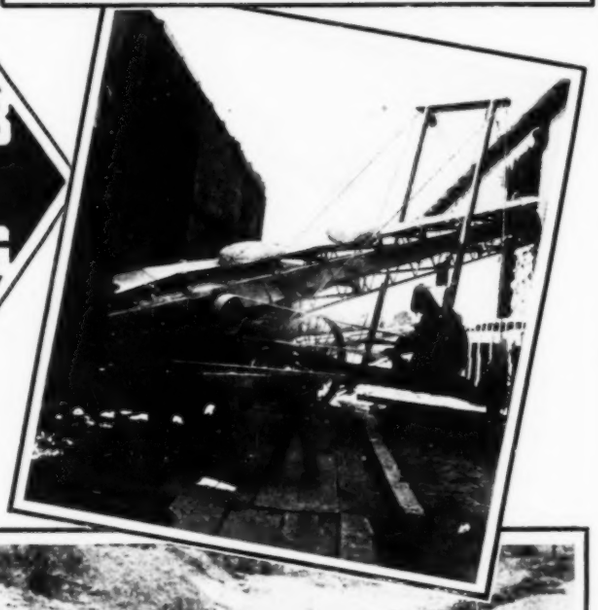


Successful Handling





B G



On Construction Jobs

On many construction jobs, Barber-Greene equipment is replacing men, speeding up work, and saving money.

In pouring wet concrete, a B-G Conveyor has cut down the gang from 27 to 10 for the Walbridge Engineering Co., 1040 S. Dearborn St., Chicago, Ill., eliminating all wet-batch wheelers, three dry-batch wheelers, and all track layers. The conveyor method has proved cheaper, simpler, and faster than the chutting plant mounted on a flat car which this company formerly had mounted on a flat car.

Shovelers have proved slow and expensive wherever they have been in competition with a Barber-Greene in loading trucks or wagons. For instance, the New England Sand & Gravel Co., Boston, Mass., have loaded 10,000 tons of gravel at a cost of $.04 per ton with a Barber-Greene. Hand shoveling on the same job formerly cost $.25 per ton.

Cement in sacks or wet clay can be handled as shown. The clay conveyor speeds up excavation work and cuts down the wheeling. The cement conveyor eliminates all wheeling and aids stacking.

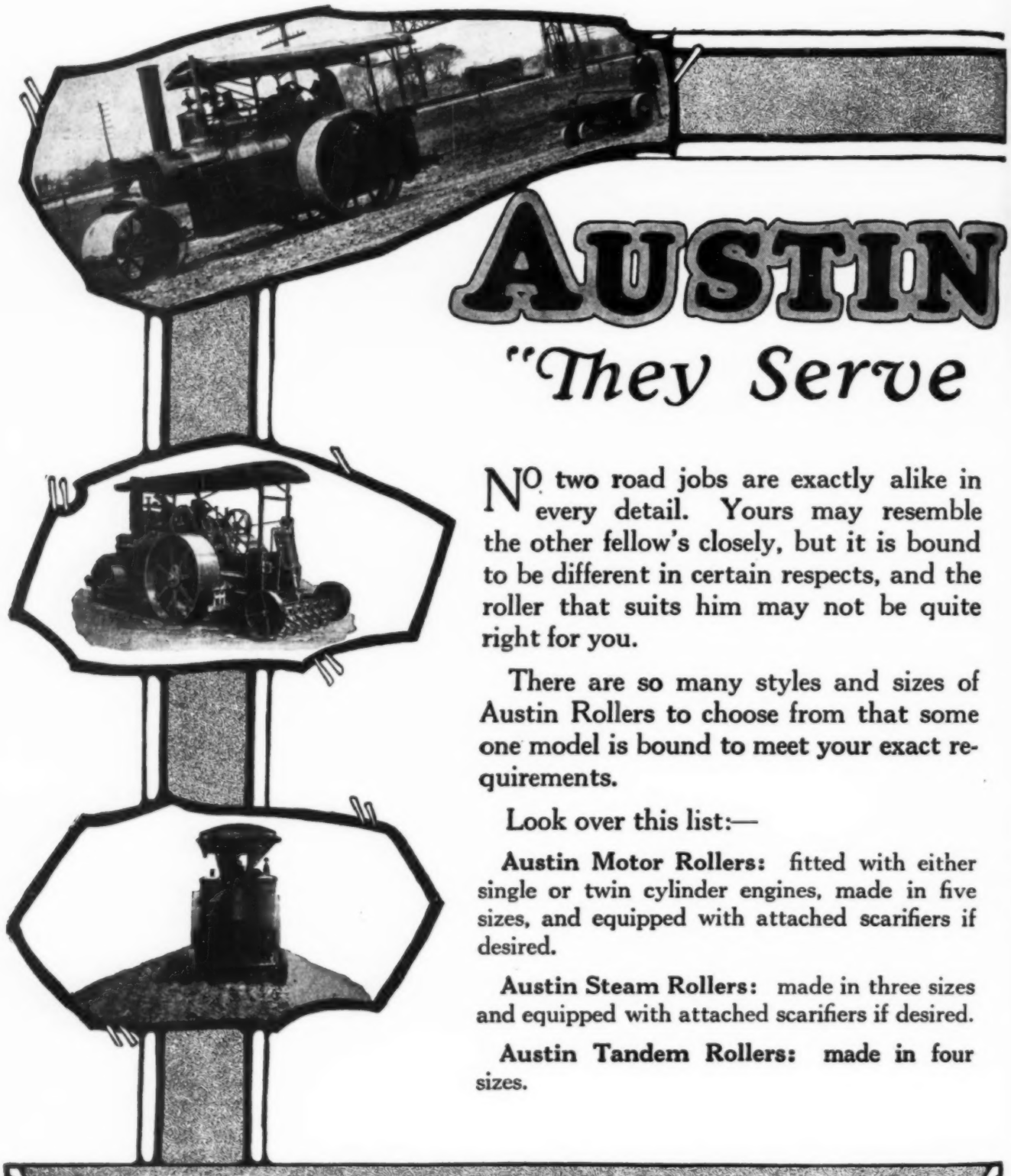
Road contractors, general contractors, states, counties, cities, and others are using B-G machines successfully to speed up their work, lessen their labor troubles, and cut their costs. Tell what your job is and we will tell you what our machines will save on your material handling.

Send the Coupon
No Obligation

Barber-Greene Company
530 W. PARK AVENUE
AURORA-ILLINOIS

Branches in Most Principal Cities

BARBER-GREENE COMPANY
Aurora, Illinois.
Please send more information about your machines
for
Name
Position
Company
City
State
Date
S M A



AUSTIN

"They Serve

NO two road jobs are exactly alike in every detail. Yours may resemble the other fellow's closely, but it is bound to be different in certain respects, and the roller that suits him may not be quite right for you.

There are so many styles and sizes of Austin Rollers to choose from that some one model is bound to meet your exact requirements.

Look over this list:—

Austin Motor Rollers: fitted with either single or twin cylinder engines, made in five sizes, and equipped with attached scarifiers if desired.

Austin Steam Rollers: made in three sizes and equipped with attached scarifiers if desired.

Austin Tandem Rollers: made in four sizes.

THE AUSTIN-WESTERN LINE · IT SERVES YOU RIGHT ·

The Austin-Western Road Machinery Co.

CHICAGO, ILLINOIS

Branch Warehouses and Service Stations

Albany	Dallas	Little Rock	New Orleans	Portland, Ore.	St. Paul
Atlanta	Denver	Los Angeles	New York City	Richmond	Topeka
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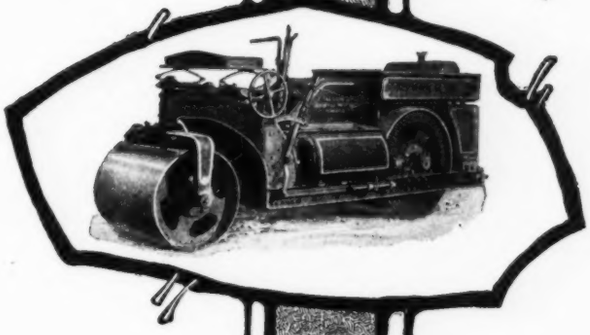
Columbus	Kansas City	Nashville	Philadelphia	San Francisco	

EXPORT DEPARTMENT
ALMACOA ALLIED MACHINERY COMPANY OF AMERICA ALMACOA
51 Chambers St., New York, U.S.A. Cables: Almacoa New York

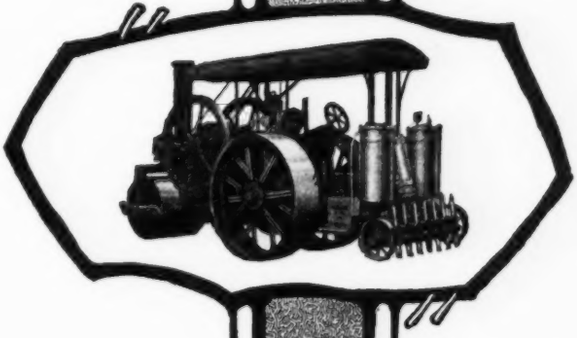
ROLLERS

You Right"

SINCE you have such a wide variety to choose from, the Austin Roller you select will "Serve You Right" from the start because it is just as good as made to order for your special needs. Also it will continue to "Serve You Right" for many years because it is correct in design, sound in material and workmanship; and is backed by a complete service organization that lives up to its name.



The whole story of Austin Rollers is told in **Catalog FX.** You will find it interesting reading, and if you are going to need a new Roller this year, you can't afford to pass it up. Then there is General **Catalog 21-X,** which describes the entire Austin-Western "Serves You Right" Line. Send for one or both of these catalogs today.



The Austin-Western Road Machinery Co.

CHICAGO, ILLINOIS

"They Serve You Right"

AUSTIN				WESTERN			
Motor Rollers	Elevating Graders	Street Sprinklers	Rock Crushers	Road Planers	Drag Scrapers
Steam Rollers	Road Scarifiers	Road Oilers	Reversible Graders	Road Scarifiers	Road Plows
Rock Crushers	Motor Sweepers	Dump Wagons	Elevating Graders	Road Drags	Ditchers
Reversible Graders	Street Sweepers	Culverts	Dump Wagons	Wheeled Scrapers	Screening Plants

THE AUSTIN-WESTERN LINE · IT SERVES YOU RIGHT ·

EXPORT DEPARTMENT

ALMACOA ALLIED MACHINERY COMPANY OF AMERICA ALMACOA

51 Chambers St., New York, U.S.A. Cables: Almacoa New York

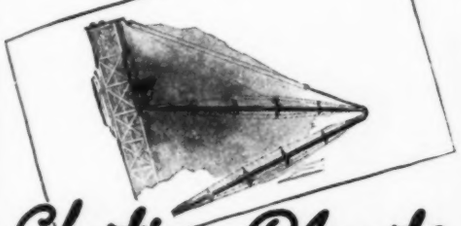
BY adding two more spokes to the Sterling wheel, the strength is doubled. The possibility of broken and flattened tires is eliminated. There is no need to "favor" the wheel by cutting down the load.

Treat it rough—treat it as though it were solid. The Sterling is also equipped with self-lubricating bushings, which permit easier wheeling and does away with all necessity for oiling. The axels are held stationary by means of cotter pins, which prevents wear on the brackets. In buying wheelbarrows take into consideration these features and you will see the true economy in buying Sterlings.

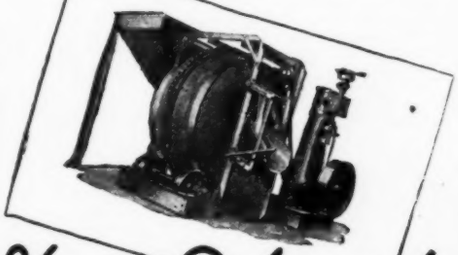
STERLING WHEELBARROW COMPANY
MILWAUKEE, WISCONSIN

New York Boston Cleveland Chicago Detroit St. Louis

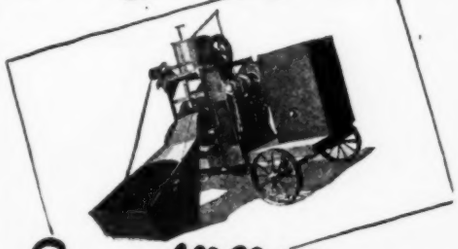
Steel Towers and



Chuting Plants



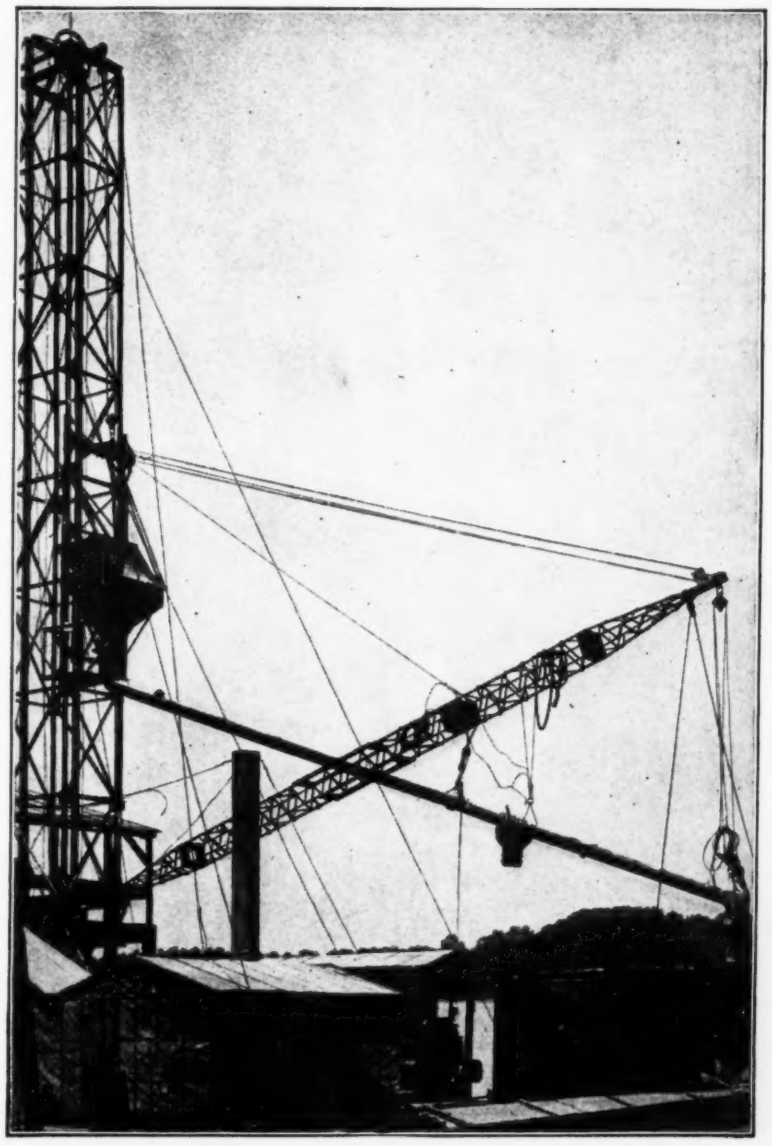
Heavy Duty and



Small Mixers

Cars and Track

Clam Shells



Eyre & Johnston, Contractors, Philadelphia, Pennsylvania, use a Lakewood Steel Tower Plant equipped with counterweight on the Severn River Bridge at Annapolis, Maryland.

Lakewood Steel Towers Built Ten Years Ago Are Still in Operation Today—This is Evidence That Lakewood Towers Are Right.

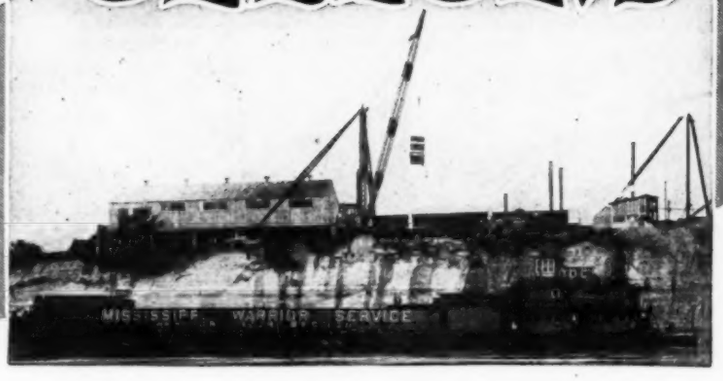
Our new Bulletin No. 23-C fully describing Lakewood Steel Tower Plants, is yours for the asking.

The Lakewood Engineering Co.
Cleveland, U. S. A.

Complete Road Plant—Paving Mixers, Road Forms, Gasoline Locomotives, Track, Batch Boxes, Subgraders, Finishing Machines, Clam Shells, Grout Mixers, Tunnel Traps

EXPORT DEPARTMENT
ALMACO ALLIED MACHINERY COMPANY OF AMERICA ALMACO

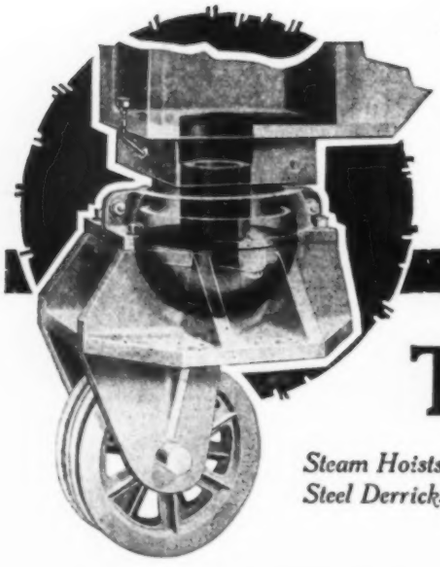
Clyde Steel Derricks



The Illustration shows a Clyde 15-Ton Steel Stiff-leg derrick on active duty for the Mississippi Warrior Service at Demopolis, Alabama. This derrick is used for handling Cotton bales between boats and railroad cars.

THE Clyde Line of Steel Derricks not only offers a complete selection to care for any class of work, but from a construction standpoint, embodies numerous features that classify them as entirely worthy to maintain the quality standards established by their makers.

Perhaps the greatest single feature is the renewable Double-Bearing Ball and Socket Base shown on the left. This permits all tilting to take place on the ball of the step bearing, while all turning is on the flat upper surface of the casting. A full flat bearing surface for turning the mast is thus provided regardless of the angle at which it may be set.



Bulletin N will give you details concerning both guy and Stiff-leg Steel derricks. The home office or your nearest branch will be pleased to supply you.

THE CLYDE LINE

Steam Hoists *Electric Hoists* *Gasoline Hoists* *Belt Hoists* *Derrick Fittings*
Steel Derricks *Excavators* *Traction Cranes* *Blocks and Sheaves* *Logging Machines*

Cutting Handling Costs

ALL over the country, Clyde Hoisting Equipment will be found in daily use helping the contractors, the manufacturers and the public utility corporations to cut operating costs.

Built as they are to definite quality standards, they have made good on all classes of operations. Hundreds of satisfied users are getting production costs that are more than meeting their expectations.

Latticed angle construction, with forty and fifty foot booms in two sections, sixty foot and longer in three sections, make handling comparatively easy. Bull wheels are especially strong and are bolted direct to the bottom casting.

Complete information about any portion of the Clyde Line furnished cheerfully.

The Southern Public Utilities Co. at its Portman Shoals Plant near Anderson, S. C., operates the 5-Ton Guy Derrick shown herewith. It is used in clearing mud and debris from in front of the rack area of water wheels.

CLYDE

CLYDE IRON WORKS SALES COMPANY

Sole Distributors for Clyde Iron Works, Duluth, U. S. A.

Branch Offices and Warehouses:

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141-149 Centre St.

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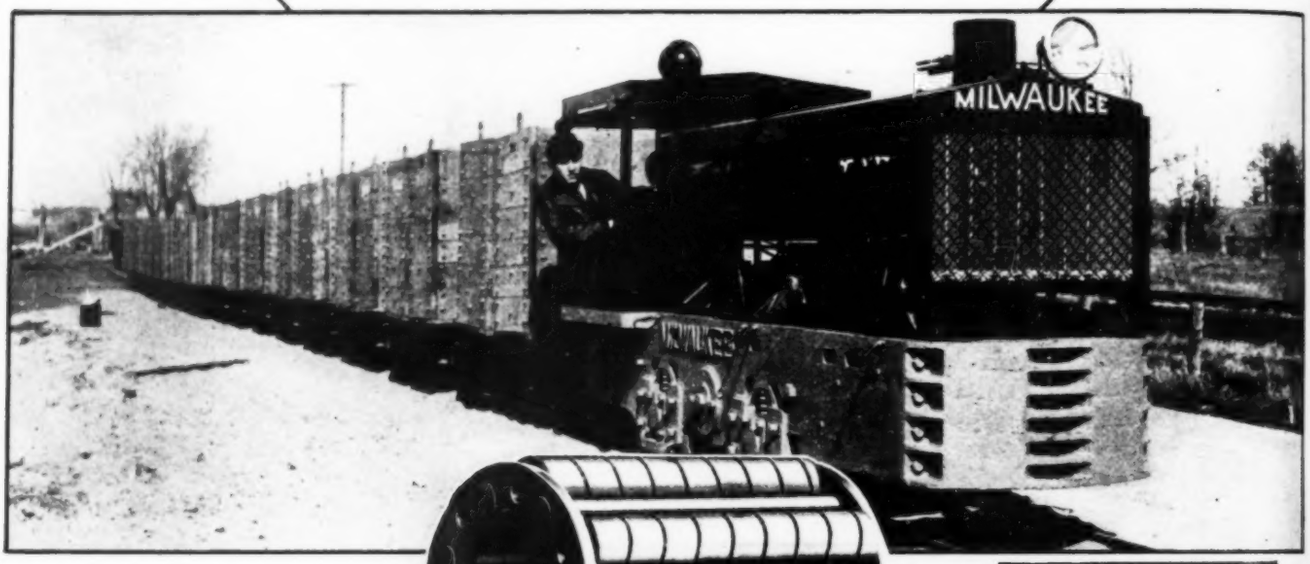
11 So. LaSalle St.

JACKSONVILLE
507 Hill Bldg.

PORTLAND
18th and Upshur Sts.

The use of locomotives and cars equipped with Hyatt roller bearings will give you:



Hyatt bearing equipped locomotive built by the Milwaukee Locomotive Manufacturing Co., used by W. E. Ule of Stevens Point, Wisconsin

Unfailing service

More trains each day

Lower lubrication costs

Longer trains per locomotive

Elimination of fussy adjustments

Worthwhile decrease in gasoline costs

Real opportunity for profit on every job

Lower cost — larger profit every foot of road

Bearings that operate properly for life of equipment

Hyatt Roller Bearing Co.

Motor Bearings Division, Detroit
Tractor Bearings Division, Chicago

USE HYATT BEARINGS ON YOUR LINE SHAFTS TOO BULLETIN 127

Industrial Bearings Division

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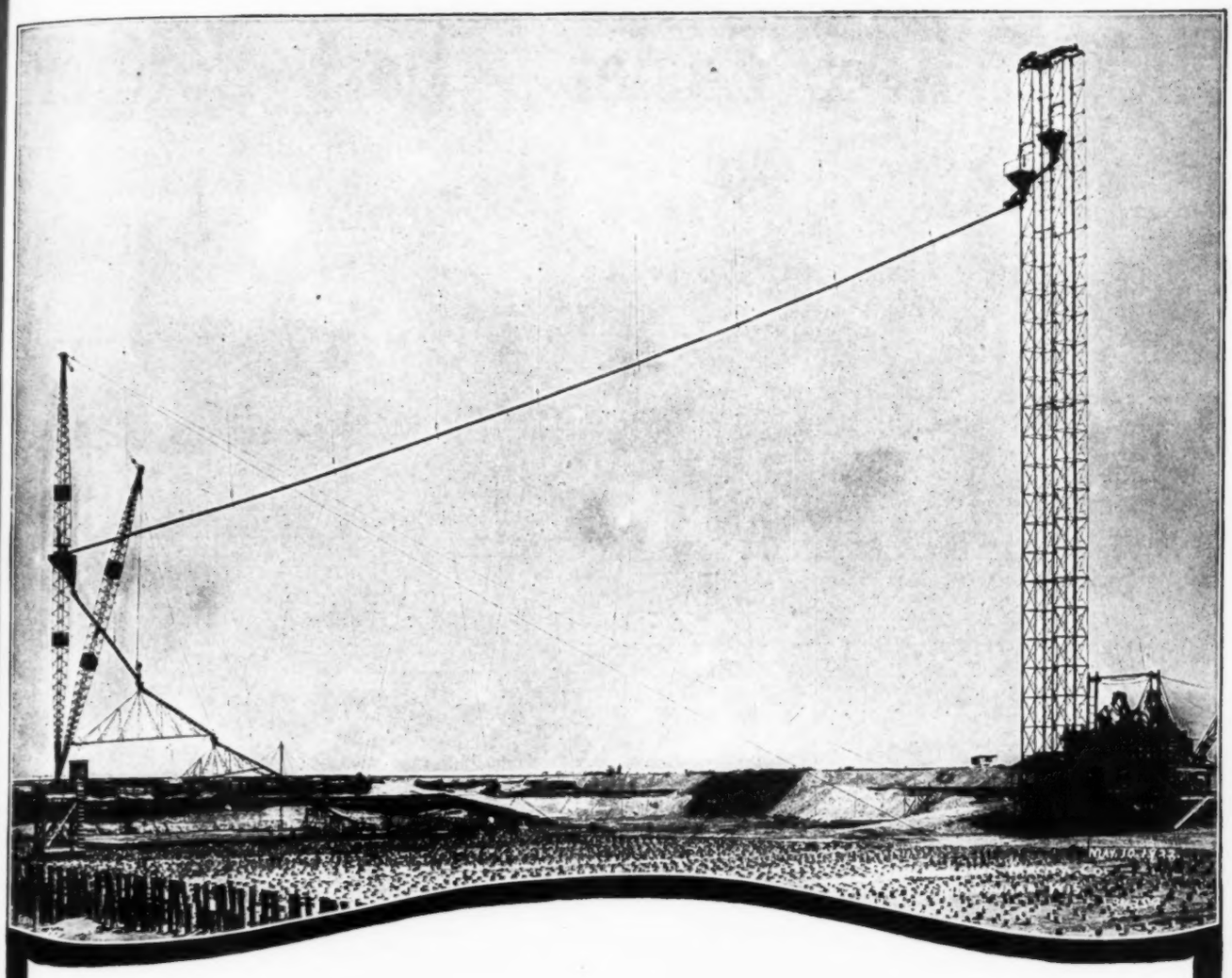
Pacific Coast Division
San Francisco



WILLIAMSPORT WIRE ROPE

is an important part of the equipment of this big Milwaukee sewerage job by the Dupont Engineering Company.

Nearly every new labor saving method contemplates the use of dependable wire rope.

Telfax Tape Marker in *Williamsport* Wire Rope definitely marks all grades, thus eliminating all chances for error and the protection this gives to the user makes *Williamsport* worthy of this positive preference.

Write us today for prices and catalog.

WILLIAMSPORT WIRE ROPE COMPANY

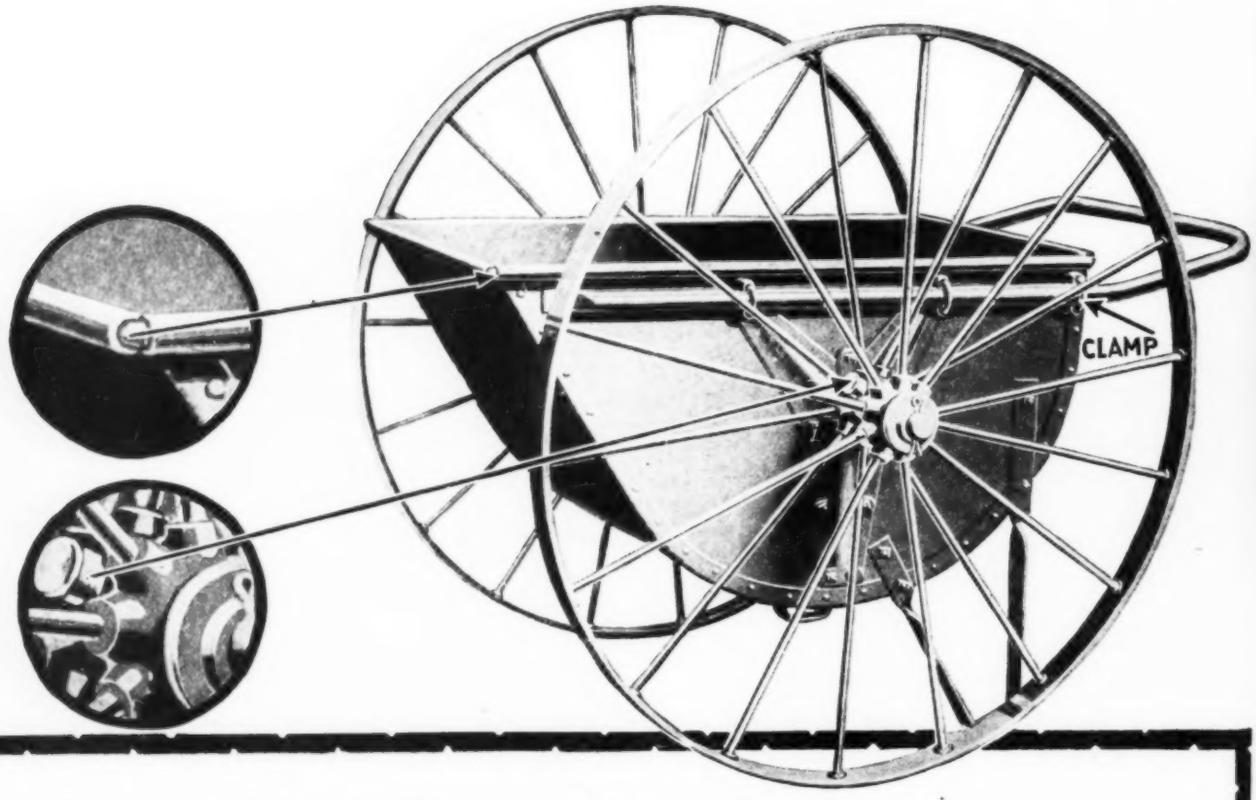
"accepted as the best"

Main Office and Works
Williamsport, Penna.

General Sales Office
Peoples Gas Bldg., Chicago

"The fastest growing wire rope plant in America"

They Wheel Easier—Last Longer



Sterling No. 6 Cart

We have continually improved the Sterling carts. The No. 6 cart is decidedly the best cart on the market. Larger loads can be wheeled and more concrete can be handled with less effort than heretofore.

Unusual strength with ease of wheeling are two features that are dominant in its design and construction.

The tray is 12 gauge, reinforced at the top edge with a continuous ½ inch rod.

The handles extend the full length of the tray and are clamped, not bolted to the tray.

You cannot cave in the sides, nor break off the handles on the No. 6.

Heavy 42 inch wheels, equipped with grease cups, assure perfect lubrication and ease in wheeling.

The No. 6 is a perfectly balanced cart and will wheel larger loads than the average cart.

WRITE FOR DETAILS

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NEW YORK
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EXPORT DEPARTMENT
ALMACOA ALLIED MACHINERY COMPANY OF AMERICA ALMACOA

MORE RAW MATERIAL AT LESS COST

Thews Increase Output and Reduce Expense

Two Type O Thews Loading Sand

THE increased output and saving shown by the first Type O on this job led to the purchase and installation of the second.

These two Thews constitute a real economy team. They are designed and built for service. Instead of taking time out every now and then, they consistently load sand, keeping a big fleet of trucks always on the move.

From the long plate girder shipper shaft boom to the ruggedly constructed truck, the Type O is built for work. Without a single useless frill the Thew has every convenience that can increase operating efficiency. Each feature of design and construction is proved correct by the greater range, the higher speed, additional power, and other outstanding and widely recognized characteristics of the Thew.

The cost figures and output record on this job constitute but one proof of Thew leadership. They are worth getting. Write for the owners' names.

About the time the second Type O was getting busy this 3-A was attacking the marl deposit for an Ohio portland cement company.

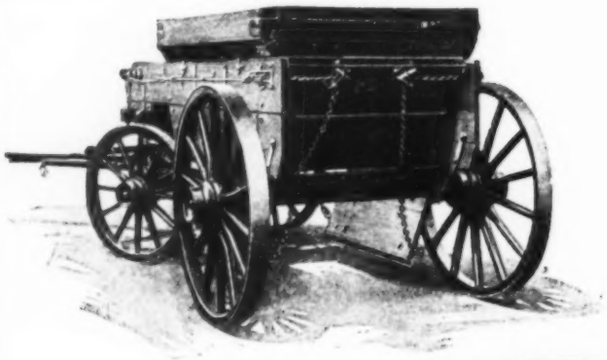
For over twelve years this company has depended on the Thew for raw materials. These men know what Thew economy means. Last year when they came to buy a new shovel it was another and bigger (1½ yd.) Thew.

Type 3A Digging and Loading Marl

If YOU want to cut your costs write for Bulletin No. 111

Thew Power Shovels

THE THEW SHOVEL CO., - - LORAIN, OHIO



Western

Here it is!

The Western-Studebaker Dump Wagon

YOU KNOW the Western Wagon, and you know the Studebaker. Having purchased the dump wagon business of the Studebaker Corporation, we undertook to design a municipal dump wagon which would combine the best features of those two successful models—the Western and the Studebaker.

Here it is—the Western-Studebaker—a little heavier than the Western, but built for use on hard streets and roads where the extra weight will be no handicap and the extra strength very desirable—a wonderfully efficient dump wagon.

Our Bulletin S-22-G, just off the press, gives the details, tells what features of each model have been retained and what discarded. Send for it.

In these two models—the Western-Studebaker, for municipal work, and the old, reliable Western, for all-round field work, we believe we have met the dump-wagon needs of contractors and municipal departments.

Western Wheeled Scraper Co.

Earth and Stone Handling Equipment

AURORA, ILL.